



FRIDAY, MAY 15.

### Sir Henry Tyler's Speech at the Grand Trunk Meeting.

The following are selections from the speech made at the half-yearly meeting of the Grand Trunk Railway Company, in London, April 27, by Sir Henry Tyler, President of the company:

We meet once more in a time of depression and difficulty, such a time, I will venture to say, so prolonged and so severe, that we can none of us—directors, officers or shareholders—blame ourselves if we were unable to anticipate it. We had previously been so fortunate, from 1876 to 1883, in advancing with most encouraging progress, that we were not prepared for the terrible state of things by which we have been so much afflicted since the commencement of 1884. We had connected ourselves most satisfactorily with the sources of traffic at Chicago; we had built up a great system of branches and side lines, in order to procure local traffic for the undertaking; we had established, or managed to control, communications with the great Atlantic ports; and we had between 1876 and 1883 actually doubled our gross receipts and trebled our net receipts, and we had almost seemed to have placed ourselves beyond the reach of serious misfortune. But during the last fifteen months all the elements of adversity have been working against us; and we have been revolving on a sort of wheel of Ixion. We have had the Furies of commercial depression, of competition and of the climate all striking their darts at us, and testing our resources to the utmost; and it is only due to the completeness of and to the great improvements that we had previously made in our system that we have been enabled to hold our own in the terrible struggle through which we have been passing. The constant vigilance which we exercised, and the strengthening policy which we previously adopted with a view to obtaining greater prosperity, have alone enabled us to struggle against this universal adversity, and it is quite certain that if we had not so strengthened our position at all points as we have done, that we should have been to-day in a very much worse position, and that each of the separate systems which we have now judiciously combined into one would have suffered very much more severely from the perverse influences by which all sections of the railway have been more or less afflicted. (Hear, hear.) It is most disappointing to us all to have met with such a check—such a prolonged check—in our progress toward prosperity, and it is but little comfort to know that many of our neighbors have suffered in proportion a great deal more than we have suffered ourselves.

Our troubles, as I have said, have not arisen in the past in any way from excessive expenditure; but they have arisen from commercial depression and from the excessive and insane competition among the different railways, and, in fact, from our getting less increase for the service which we have performed. In fact, I can only compare it to Sisyphus rolling the stone up the hill while it always came rolling down upon him again; or to the Danaides, who had to pour water continually through a sieve; because that is the sort of process we are going through, to try to work with lower rates and to make a profit out of them.

But the most important point I have to touch upon to-day is the question of "pooling" arrangements. We can stand a good deal of commercial depression, we can stand a good many snow-storms, but we cannot withstand the effects of unprofitable rates for the vast amount of work that we are doing. No company can successfully struggle against such a state of things. Therefore, the important matter we have to consider, and the all-important matter I want to deal with when I get out to Canada, is, how it is possible we can induce the various companies who are competing with each other and with us to adopt some system which shall prevent this suicidal competition going on any longer. The history of the pooling arrangements for the last half-dozen years is a very long one, and I will not weary you in going through it. There are several kinds of pools. There are a good many east-bound pools—for east-bound traffic on railways merging upon New York, pools from Chicago and other places on railways running toward New York. Then there is the Chicago pool of live cattle and dead meat traffic, and there is the Chicago dead freight pool, as it is called; and then there are west-bound pools from New York and from New England. Well, some of these pools have been in an utter state of disorganization, and some are still working. For instance, we pool with the New York Central to New England. That pool is still working, but some of the other pools are utterly disorganized. About ten years ago the Grand Trunk originated this pooling system to do away with the undue cutting of rates, and the Grand Trunk has desired nothing else ever since than to continue it, even at a disadvantage to itself. I have said to you here, over and over again, that we thought it good policy even to accept less than we were entitled to, if only the other companies could be induced to adhere to the regulations of the pool. Well, we have gone upon that principle. We have from time to time accepted less, and a great deal less, than we have been entitled to. We have, during the last three or four years, lost very largely on account of traffic which we have over-carried in the pool, and have had to even up, as it is termed, and on account of the pool expenses. We have been able to carry a great deal more traffic than we have been entitled to under the pool, and have been obliged to pay over-excess. Notwithstanding this we have not attained the objects for which the pool was established. The objects of the pool were that rates should be maintained and that the lines taking part in the pool, each carrying an agreed share of traffic, should not cut the rates to obtain the traffic; and during the past year, I do not hesitate to say, we should have done better if there had been no pool, rather than in working under such a state of chaos as has been experienced. Now, I will not give you all the dates and all that has been done, but one of the principal points is this—that we for 16 years, with great pains and trouble, built up a fast freight line called the National Despatch, to take traffic over our line and the Michigan Central. This arrangement went on until the Michigan Central wanted to send all its traffic by the Canada Southern—after it had leased that line—instead of over our line, and as they chose to transfer our traffic from our cars on to the Canada Southern and refused to work fairly with us in the National Despatch line; they, in fact, foolishly threw off our traffic, which we did not want them to do. We preferred to work with the Michigan Central, as well as with the Chicago & Grand Trunk. They compelled us—they, by their action, forcibly turned off this traffic, which would otherwise have gone by the Michigan Central, to the Chicago & Grand Trunk Railway. Well, in one respect, that was an advantage. It gave us more traffic

on the Chicago & Grand Trunk; but in another respect it was a serious disadvantage. The Chicago & Grand Trunk Co. naturally required that to its previous proportion of the Chicago pool should be added the National Despatch business that had been carried by the Michigan Central, and which has since been carried by the Chicago & Grand Trunk. You would have thought that nothing could have been more reasonable or just than that the Chicago & Grand Trunk Co.'s proportion should have been enlarged and increased by the proportion it had acquired from the Michigan Central; but the other companies did not agree with that. Mr. Fink made a most elaborate report, in which he gave us a proportion of 14.7 for the Chicago & Grand Trunk line from the pool. That was referred to the arbitrators; they cut it down to 13 instead of 14.7. That was again referred to arbitration, but we did not get justice. Still, we accepted the injustice, and continued to work and take the lesser proportion, and paid up what we over-carried, and yet we did not get what we wanted, which was the keeping and maintaining of rates. Under those circumstances, I think you will admit that the Chicago & Grand Trunk was right in giving notice, which we did, to leave the pool on April 1, and we did it, not in any haste or temper, but as a matter of deliberate policy, because we knew that was the only way in which we could bring about proper terms. Since that time there have been further negotiations. There have been meetings in New York, and we have been asked, and have acceded to the request, that we should defer our leaving the pool from April 1 to May 1, and the date was subsequently extended to June. And then there was a meeting in Chicago, because when the Trunk Lines Committee found they could not settle matters in New York, they requested to have a meeting in Chicago, which took place on April 1, of all the lines there interested in east-bound traffic. There was, accordingly, on April 1, perhaps the largest and most enthusiastic meeting that ever was held. There were about 100 railway men present, and Mr. Seagrave attended the meeting on our behalf, and I hope that meeting will lead to some result.

[In this connection Sir Henry Tyler read to the meeting the letter from Commissioner J. W. Midgely, of the Southwestern Association, to Mr. Fink, suggesting the organization of a western pool covering all junction points.]

The whole question comes to this: that you have to embrace every point from which the traffic will be sent, and every point for which it is destined, and until you have done that, and given arbitrary powers to the three commissioners in that way, we shall have no lasting peace on that continent.

### The Hoosac Tunnel Bill.

The Hoosac Tunnel bill, now pending in the Legislature, wisely refrains from prescribing a definite and arbitrary adjustment of the vexed problem. On the contrary, it lays down in broad terms the principles which should underlie an adjustment, and, if it shall be found practically possible to accomplish the desired end, the bill vests in the proper officials the power to secure it.

It should constantly be borne in mind that the legitimate object of the state, in originally undertaking the enterprise, was not to acquire a profitable railroad property, or to dictate as to systems of railway development, but to pierce a mountain and to reduce a natural obstacle in the way of the commercial development of the state. This accomplished, and its cost reimbursed, so far as possible, the hand of the state should be withdrawn and the natural development of railway facilities should take its own course. While this cannot be fully realized, the pending bill recognizes the justice of the principles involved and promotes their observance.

It is conceded on all hands, and practically by the presence of rivals in the field, that the proper use of the tunnel and the state's road is as a constituent part of a continuous and consolidated system from the seaboard at or near Boston to the state's western line, or to the Hudson, where it may connect and advantageously deal with the trunk lines to the West. It is not for the interest of Massachusetts, either as a state or as a community, that the business administration of this line should be in the state. The regulation of the business by the presence in the market of the state as a competitor is not a sound method. The interest of the state, for such time as it must continue, should be in the form of a funded investment, and not as a share in a business enterprise. The value of the tunnel and the state's road should be represented by a fair proportion of the securities of the consolidated line of which they form a part.

These principles accepted, the present attitude of the railroads, lying in whole or in part upon the proposed link, introduces a new and delicate complication. Here are several corporations, each claiming to control a necessary link in the system, and each seeking to obtain control of the state's property, that it may, in the consolidation, dominate over all the rest. Besides these existing competitors, there are numberless suggestions of plans by which new corporations may be formed, having the same object in view. Thus the state has hitherto been asked to place her property in the hands of some one interest, to use as a weapon against the others.

It is not too much to say that the bill under consideration recognizes and sustains the principles enumerated, and while, as its name indicates, it promotes consolidation, it deals justly and firmly with all the competitors, and offers to the one that can best qualify itself for its management the opportunity of securing the property of the state.

The bill provides that any railroad corporation, whether now existing or hereafter formed in accordance with its provisions, which shall be "in lawful possession and control of a continuous line of railroad, in the condition in which said railroad now is or may be at the time of acquisition, from an eastern terminus in Boston, Somerville or Cambridge, to a connection with the Troy & Greenfield Railroad," may negotiate with the Governor and Council for the union or consolidation of the state's property, consisting of the Troy & Greenfield Railroad and the Hoosac Tunnel, with its own line; and the bill gives to the Governor and Council the authority to conclude such union or consolidation, and to "accept stock and bonds of such railroad corporation in consideration therefor."

The consolidated corporation thus formed then takes its legitimate place among the railroad corporations of the state, subject to all the general statutes of the commonwealth, divorced from any peculiar government protection or responsibility, and must work out the natural and inherent possibilities of the property which it owns. In its dealings with connecting roads it will be governed by the general laws against discrimination, compelling interchange of business upon proper and equitable terms. This status of the property is founded upon legitimate laws of commercial economy, and in this way, and in this way only, can the true value of the state's property, be it much or little, be properly demonstrated and realized.

Moreover, the state's interest will be in a form which can be defended and in which it can permanently remain so long as it may be necessary. The state will not be in the market as a common carrier in competition with private corporations, its own citizens and its own creatures, but instead of occupying this anomalous and illegitimate position it will be, as it properly may, the owner of investment securities which

will take their place in the sinking fund as against the state's outlay upon the property.

While, therefore, this bill seems entitled to commendation as sound in principle and wise in method, it is by no means to be regarded as certain that its passage will result in the immediate or early consummation of the system contemplated. Even if this end is not secured, the bill will not have been passed in vain. Among the several competitors it is neither just nor adroit, at the present time, for the state to prefer one or to enact legislation which shall be practicable only in dealing with one bidder for the property. This bill will develop the market and not restrict it. This bill says in effect what has heretofore been said by commissioners and high authorities on the subject. It says: "The state favors consolidation with that railroad system which can best assure the proper development of the property consistent with the commercial welfare of the state." Properly regarding, therefore, the possession or control of a unified railway system from the seaboard to the Hoosac Mountain as a necessary prerequisite of this development, it says that with any corporation which has acquired this commanding position the Governor and Council may deal, and only with such a corporation. More than this the commonwealth should not say.

If this bill shall pass, of which there seems but little doubt, the Hoosac Tunnel, instead of being sought as a weapon of power as in the past, will in the future be offered at its just value to the corporation that shall have acquired a legitimate power, which power will be a guarantee of the repayment of the state and of the advancement of her traffic facilities.—*Boston Advertiser.*

### Consolidation Locomotive for the Norfolk & Western Railroad.

The accompanying illustrations represent a fine class of consolidation engine which has been lately placed upon the Norfolk & Western Railroad.

The first batch of consolidation engines for that road were built by the Baldwin Locomotive Works from the specifications of Mr. Charles Blackwell, who until very recently was the Superintendent of Motive Power of the Norfolk & Western.

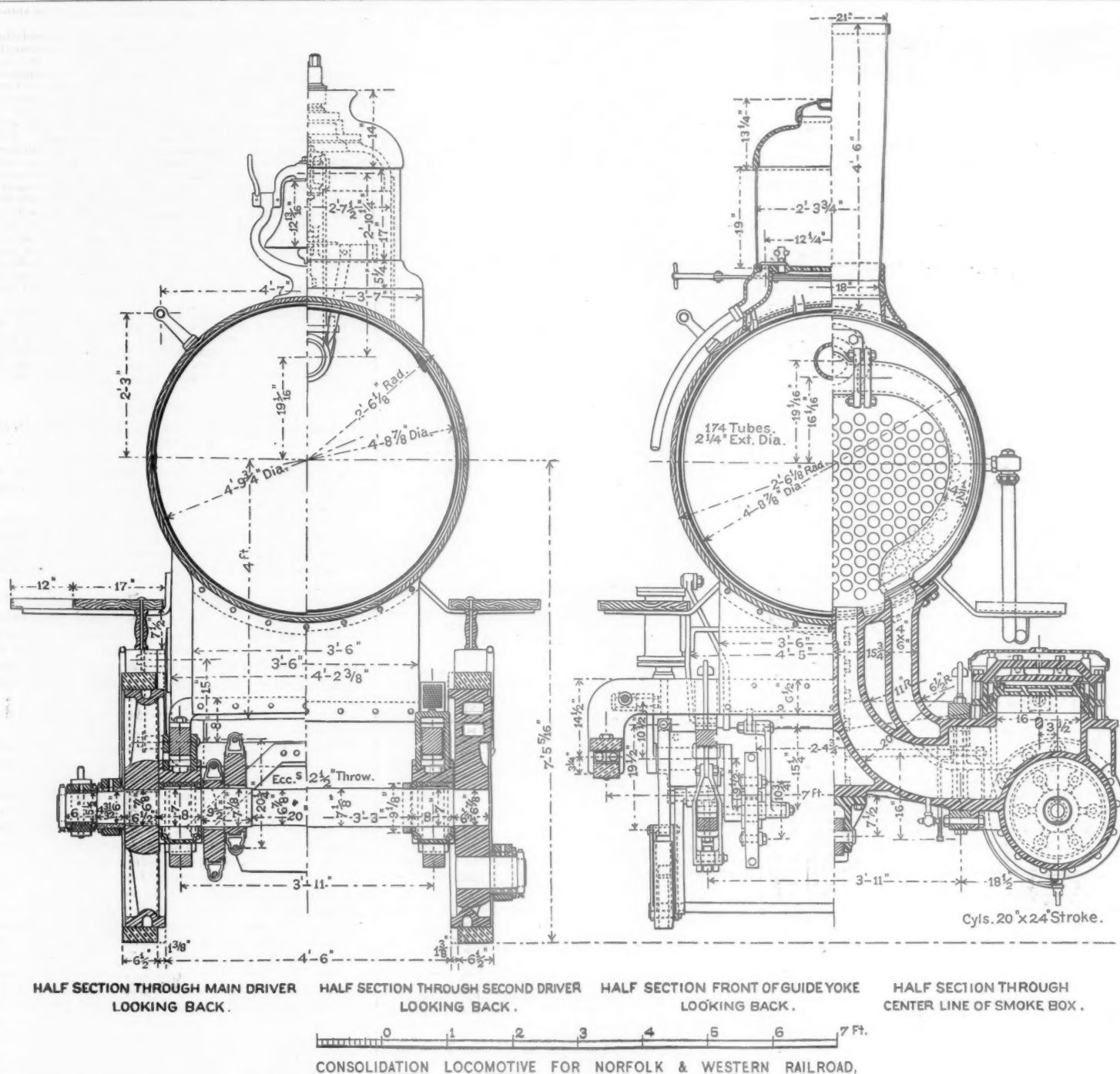
The engine we now illustrate was built by the Roanoke Machine Works from drawings and specifications prepared by Mr. Blackwell, after the Baldwin engines had been at work some little time. Such alterations and improvements in design as running experience showed to be advisable are therefore embodied in the engine shown in the accompanying illustrations.

Engine No. 122 is exhibited at New Orleans, and is the heaviest engine and the only consolidation engine there.

The modifications thus introduced on the ordinary type of consolidation have been chiefly directed to promote economy of fuel. The fire-box has been placed above the frames, giving a larger grate area. The saddle plate has been made deeper, giving a greater distance between the top of the grate bars and the under side of the brick arch. This tends to equalize the action of the draft on the fire, and gives more space for the mixture of the gases beneath the brick arch.

The steam pipes and steam passages in the saddle have also been enlarged so as to diminish the loss of pressure in the cylinders, which is much more considerable than most people imagine. The saving of fuel achieved by these alterations has been so marked that we understand that the standard Baldwin consolidations will in future embody these alterations. The difference between the initial pressure in the cylinder and the boiler pressure in a large number of indicator diagrams illustrated in our issue of Jan. 2, 1885, varied from 6 lbs. to 50 lbs. The average loss of pressure was no less than 23 lbs. The diagrams, taken with a full throttle opening, showed a loss varying from 9 lbs. to 21 lbs., and an average loss of 15 lbs. This is a loss which it would be well to endeavor to minimize, especially when it can be cheaply and easily effected by enlarging the steam pipes and passages, using the Allen internal passage in the slide valve, and, above all, enforcing the rule that engines in good condition must be run with the throttle wide open, the speed being regulated solely by the reverse lever.

These engines have lately been burning slack with satisfactory results. It is found that provided the slack is not more than a few weeks old, a good fire can be maintained. The hydrocarbons, which give soft coal most of its heating properties, are more or less volatile, and are apt to disappear when the slack is exposed to the weather for any length of time. The slack has been burned by reducing the width of the spaces in and between the grate bars, while the effect of the blast on the fire has been increased by placing a lining in the stack, as shown in the annexed diagram, and by the use of a single blast nozzle. The discharge of the exhaust from one cylinder was found apt to produce an increase of back pressure in the exhaust line of an indicator diagram taken from the other cylinder, unless great care was exercised in shaping the exhaust pipe. The efficiency of the blast of course depends greatly on the size of the chimney; as the steam expands from the blast nozzle it should exactly fill the chimney as with a piston, sucking the contents of the smoke-box out after it. If the chimney is so large that the steam cannot completely fill it, it is obvious that the vacuum formed will be imperfect, and consequently part of the useful effect of the blast will be lost. The back pressure in the cylinder appears to be influenced by the size of the blast nozzle rather than by the size of the stack, and therefore in some cases it seems to be possible to increase the efficiency of the draught by diminishing the diameter of the chimney, and at the same time, lessen the back pressure on the piston by increasing the diameter of the blast nozzle. In this engine, when burning slack, the single blast nozzle was made 4½ in. diameter, and the internal diameter of the stack was reduced to 16 in. by means of a liner. The burning of slack effected a saving of \$82 per engine per month. This is based on an average mileage per engine of 2,400 miles per month, and with an average train of about 500 tons weight.



The price of slack is taken at 50 cents per ton, and the price of the run of mine coal \$1.30 per ton.

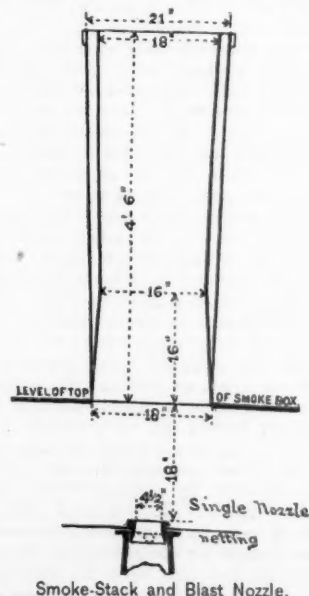
The method of firing adopted in burning slack is a little peculiar, but is the result of practical experiments. The coal is thrown toward the sides and back end of the box, and is

as possible. But it is obvious that a good wall of coal against the sides of the box prevents any currents of cool air running up beside the fire-box plates, and tending to crack them. The coal heaped against the sides of the box gradually cokes, and when it rolls into the centre of the box is, as it were, prepared for complete combustion.

This method of firing, piling the coal against the sides rather than throwing it into the centre of the box, is strongly advocated by Michael Reynolds, the author of a work on "Locomotive Engine Driving," which has attained a large

circulation in England. He states that by this method of firing "the centre of the fire is kept free from dirt, which falls down by the sides of the box, and assists in preventing the cold air from touching the plates."

The disadvantage of this mode lies in the liability of the fire to burn into a hole in the centre, where the fire is thinnest and the combustion most intense. A hole in the fire is always to be avoided, especially when burning small coal. The slack simply falls through the opening into the ash-pan, catches fire there, and the grate-bars, assailed



heaped up to a considerable height there, as much as 20 in. at the back end having been found to give good results. The centre of the fire is, however, kept thin, and is partly fed by the coal rolling into it from the sides. This method of firing differs greatly from that usual here, firemen generally endeavoring to keep the surface of the fire as nearly level

as possible. But it is obvious that a good wall of coal against the sides of the box prevents any currents of cool air running up beside the fire-box plates, and tending to crack them. The coal heaped against the sides of the box gradually cokes, and when it rolls into the centre of the box is, as it were, prepared for complete combustion.

Engine and Coal Tests, Norfolk & Western and Shenandoah Valley Railroads, 1884.

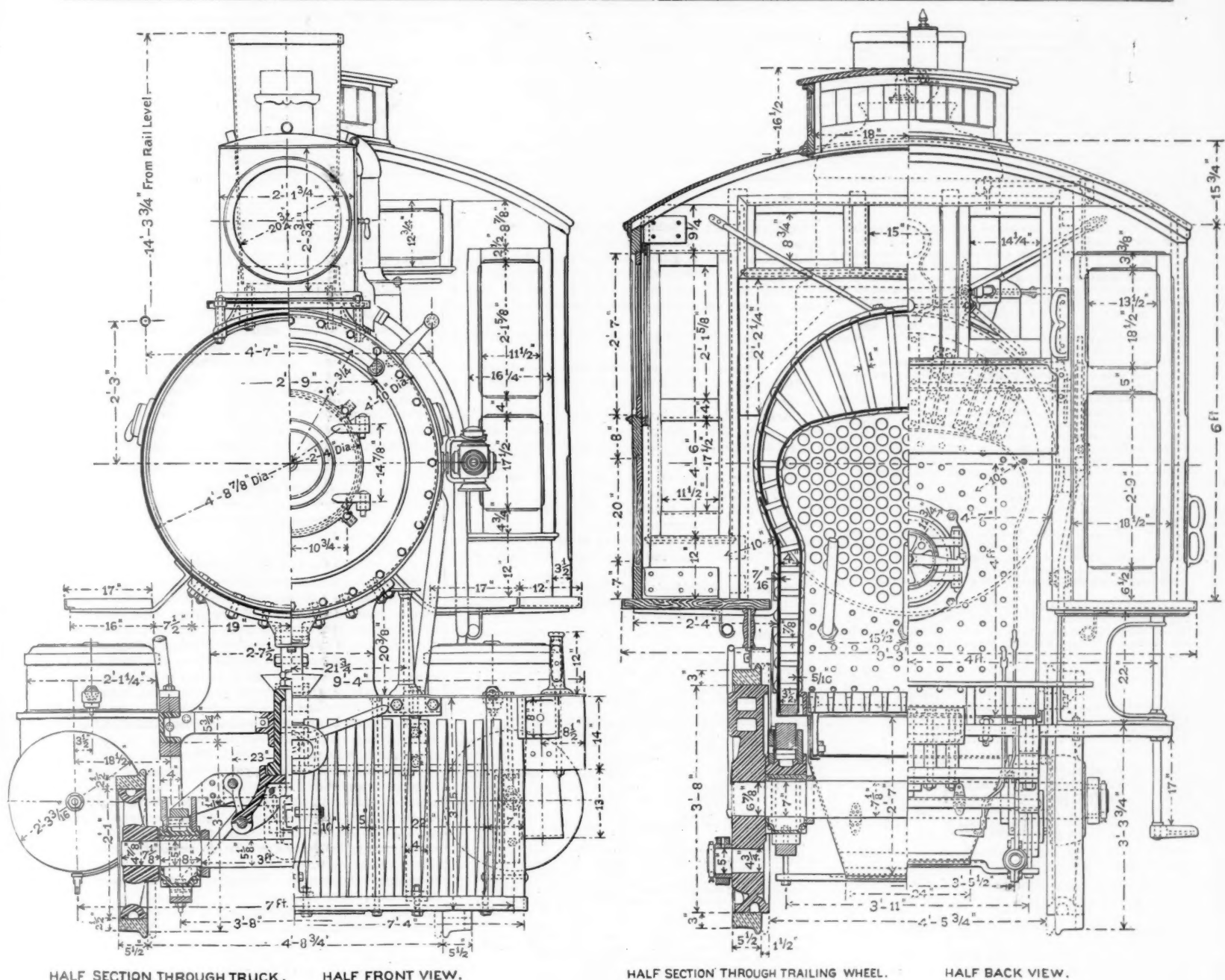
TABLE NO. I.

RAILROAD.	Norfolk & Western	Norfolk & Western	Shenandoah Valley	Shenandoah Valley	Shenandoah Valley
No. of engine.....	No. 95.	No. 121.	No. 8.	No. 22.	No. 44.
Class of engine.....	Passenger.	Consolidation freight	Passenger.	Ten-wheel freight.	Consolidation freight
Cylinders, dia. and stroke.....	18 in. x 24 in. 68 in.	Engine illustrated.	17 in. x 24 in. 63 in.	18 in. x 24 in. 51 in.	20 in. x 24 in. 50 in.
Kind of coal used.	Poca- hontas.	Consoli- dated mines.	Poca- hontas.	Consoli- dated mines.	Poca- hontas.
Coal burned in lbs.....	39,310	38,940	94,136	62,251	191,444
Water evaporated in lbs.....	244,592	241,306	629,057	619,729	1,014,444
Temperature of feed water in degrees, Fah.....	59°	51°	35°	42°	795.6
Average working boiler pressure in lbs. per sq. in.....	140	135	140	140	135
Equivalent evaporation from and at 212° Fah. in lbs. water per lb. coal.....	7.51	7.47	8.205	8.197	7.70
Total engine or train miles.....	772	772	772	772	1014.4
Total car miles.....	4,204	4,161	16,384	15,208	6,392
Total ton miles.....	97,460	94,270	377,359	365,068	180,732
Coal burned per car mile in lbs.....	9.350	9.358	5.745	6.0679	9.8
Coal burned per ton mile in lbs.....	0.4033	0.4130	0.2494	0.2523	0.418
Average weight of train in tons, exclusive of engine and tender.	128.5	128.5	512.8	458.3	81

NOTE 1. The coal used firing up and during any long lay over was deducted, the level of fire on grate as of water in boiler being as nearly as practicable the same at commencement as at close of each trip.

NOTE 2. The higher efficiency of engine 44 S. V. over 121 N. & W. is attributable to the different conditions of the roads. The trains on the S. V. are limited by a few heavy but short grades, while the rest of the road is very easy running; on the N. & W. it is one succession of hard pulls, the fire having to be forced for great part of the distance.





HALF SECTION THROUGH TRUCK.

HALF FRONT VIEW.

HALF SECTION THROUGH TRAILING WHEEL.

HALF BACK VIEW.

CONSOLIDATION LOCOMOTIVE FOR NORFOLK & WESTERN RAILROAD.

by fire from below as well as from above, soon melt, and the whole fire drops into the ash-pan. The hollow method of firing therefore requires considerable watchfulness to prevent holes burning in the middle. As it is always a little uncertain to what extent the coal will roll from the sides to the centre, it is well to fire often, with a small quantity on the shovel.

Until engines of the consolidation type were introduced by the late joint management of the Norfolk & Western and the Shenandoah Valley railroads, the freight trains of the former were hauled by engines of the eight-wheel and ten-wheel types; and by ten-wheel engines on the line of the Shenandoah Valley.

On the Norfolk & Western the maximum capacity on the Western, or Mountain Division, for the eight-wheel engines, having 17 in. x 24 in. cylinders and 54 in. driving wheels, was 12 loaded cars of 40,000 pounds lading; and 16 cars for the ten-wheel type, having 19 in. x 24 in. cylinders and 55 in. wheels. By the employment of consolidation engines, with 20 in. x 24 in. cylinders, and 50 in. wheels, on this road, the maximum load has been increased to 21 cars, or 75 per cent.

more than that of the eight-wheelers, and 31 per cent. more than that of the ten-wheel engines.

On the Shenandoah Valley Railroad the maximum load for the ten-wheeled engines was 13 cars; the consolidation type can take 20 cars, or an increase of 54 per cent.

The effect of the unusual height of the centre of gravity of these engines is very marked when running round the sharper curves of the road, it being difficult, with the eyes closed, to tell the difference between curves or tangents. The satisfactory results in this respect obtained on the Philadelphia & Reading—also owing to high centre of gravity—are fully confirmed by the performance of these engines.

In order to ascertain the relative consumption of fuel by the ten-wheeled and consolidation engines, a careful series of experiments were conducted on the Norfolk & Western, and the Shenandoah Valley Railroads, and under the direction of Mr. C. Blackwell, the Superintendent of Motive Power; at the same time the performance of the passenger engines was also tested.

As it was considered desirable to know the relative merits

of the Flat Top coal used on the Norfolk & Western, and the Hampshire & Baltimore coal, used on the Northern Division of the Shenandoah Valley, experiments were taken with each description of coal, on each of the three different types of engines, and with the results shown in the accompanying tables.

It may be stated that in the calculations, two empty cars were considered equal to one loaded car.

In regard to the engines used, it may be noted that No. 95 is a powerful passenger engine and No. 8 a lighter passenger engine, with smaller cylinders and wheels, both built by the Baldwin Locomotive Works. No. 44 is a consolidation built by the Baldwin Locomotive Works, and No. 121 is a sister engine to No. 122, illustrated in the accompanying engravings and was built by the Roanoke Machine Works.

The following extracts from the report of Mr. R. P. C. Sanderson, who personally conducted the experiments, may prove of interest:

**General Features of the Track.**—The average curve of the road is 4° 10', the sharpest 10°. The two steepest grades on the Southern Division are as follows: Going north; grade 54.9 ft. per mile for 1,290 ft., with 7° curves, and 79.2 ft. per mile for 15,500 ft., with 6° curves. Going south; grade 79.2 ft. per mile for 14,700 ft., with 6° curves, and 79.2 ft. per mile for 17,390 ft., with 8° curves. On the Northern Division, the steepest grade going north is 84.48 ft. per mile for 0.19 mile. The steepest grade going south is 89.76 ft. per mile for 0.88 mile. The sum of ascents going north is 4,150.81 ft., and going south 4,482.06 ft. Tangents, 156.03 miles and curves, 81.56 miles.

Engines 22 and 44 ran on the Southern Division only; the passenger engine No. 8 ran on both divisions.

**General Remarks Concerning the Coals Used.**—Flat Top coal; mined at Pocahontas, Va. This coal makes a very bright, hot fire. It cokes on the grate even when slack is used, and but a small proportion is carried off by the draught. It does not need much hooking up; one trip on No. 8 was made between Roanoke and Hagerstown, 239 miles, without a hook being put into the fire.

The trains never stalled for want of steam on the heaviest grades, and the engines threw much less fire than when burning the Hampshire & Baltimore coal. The injectors could be kept full on when climbing the grades, without causing the steam pressure to fall.

**Hampshire & Baltimore Coal.**—This coal does not make such a hot fire as the Flat Top coal. There was always a dull, lurid appearance, contrasting markedly with the white, hot hue of the other coal fire. This coal burns into holes and requires constant hooking and level-

Engine and Coal Tests, Norfolk & Western and Shenandoah Valley Railroads, 1884.

TABLE NO. II.

DIMENSIONS OF LOCOMOTIVES.

Number of Engine.	95	121	8	22	44
Type.	American.	Consolidation.	American.	Ten-wheeler	Consolidation
No. wheels coupled.	Four.	Four.	Four.	Six.	Eight.
Cylinders, dia. and stroke.	18 in. x 24 in.	20 in. x 24 in.	17 in. x 24 in.	18 in. x 24 in.	20 in. x 24 in.
Driving wheels, dia.	54 in.	54 in.	53 in.	51 in.	50 in.
Valves, pattern.	Allen.	Allen.	Allen.	Allen.	Allen.
Travel.	5 1/2 in.	5 1/2 in.	5 1/2 in.	4 1/2 in.	5 1/2 in.
Outside lap.	3/4 in.	3/4 in.	3/4 in.	3/4 in.	3/4 in.
Inside lap.	none.	none.	1-6 in.	1-6 in.	none.
Lead, full stroke.	1-16 in.	1-16 in.	1-16 in.	1-16 in.	1-32 in.
Fire grate, area.	16.27 sq. ft.	16.27 sq. ft.	16.6 sq. ft.	15.6 sq. ft.	29.87 sq. ft.
Heating surface, total.	1,169 sq. ft.	1,169 sq. ft.	1,025.4 sq. ft.	1,262 sq. ft.	1,466.8 sq. ft.
Tubes, number.	185	185	161	140	174
Boiler, diameter.	2 in.	2 in.	2 in.	24 in.	24 in.
Boiler, length.	10 ft. 11 in.	10 ft. 11 in.	10 ft. 10 1/4 in.	12 ft. 9 in.	13 ft. 1 in.
Boiler, smallest diameter barrel.	52 in.	52 in.	47 in.	48 in.	56 in.
Exhaust nozzle, number and diameter.	one 4 3/16 in.	one 4 3/16 in.	two 2 3/4 in.	one 3 3/4 in.	two 3 3/4 in.
Stack, minimum diameter.	16 in.	16 in.	16 in.	16 in.	17 1/2 in. base.
Stack, maximum diameter.	18 in.	18 in.	17 in.	16 in.	21 in. top.
Extension smoke box.	yes.	yes.	yes.	yes.	yes.
Brick arch.	yes.	yes.	yes.	yes.	yes.





to be a tendency at present in certain quarters to equalize train mileage and rates of pay, but there is still a considerable lack of uniformity in this respect in the practice of many of our railway corporations.

When trainmen are making the maximum mileage per week which can be expected, it is still possible to reduce the force in two other ways. We may inquire, first, whether we can reduce the number of men per train, and, second, whether by the removal of a train here and the changing of the time of a train there the traffic of a road cannot be conducted with fewer trains, and yet, all things considered, with equal or nearly the same satisfaction to the freighting and traveling public (or at least with facilities which are reasonable under the circumstances), and thus enable the road to dispense with the service of an occasional train crew.

Here the Superintendent or Master of Transportation will find a field well worthy of his best efforts, and his ability will be somewhat measured by his success. How far, if at all, the number of men allotted to each train can be reduced without danger or delay to the traffic, is a nice question, to say the least; but it is still more difficult to determine when and how to cut down the number of trains, and rearrange the timetable without detriment to the volume of the traffic, and yet with benefit to the corporation purse. To be able to do this well, the officer must have an intimate acquaintance with the nature and amount of the various items of freight and passenger traffic, so as to be able to forecast the effect upon earnings of any change in number and arrangement of trains. One class of passenger traffic might be entirely destroyed, while another was greatly strengthened or even created, by a projected change in the time of certain trains. Generally speaking, the less the competition the less will the operating officer be hampered in his endeavors to economize by modifying his time-table.

Similar in some respects to these problems are those which may arise as to train crews and engines used at important stations for switching purposes and as helpers for freight trains on roads of heavy grade, and the question will often arise of adopting a policy of increasing the capacity of freight engines or of doubling up light engines in order to increase the average number of cars per freight train, and so reduce the number of train crews required to handle the traffic. Sometimes switching crews at certain hours of the day, when they would otherwise have little to do, can, without slighting their regular work, be sent along to the top of some not far distant grade to pick up on their way such freight cars as have been dropped off by heavily loaded trains, and leave them at the summit for the next freight train to carry along.

Again it may be found that by asking a little extra work from trainmen, which they usually will not object to render in times of financial straits, it can be arranged for train crews to do their own switching, and thus special switching crews and engines can be dispensed with at many points where at first sight they might be deemed indispensable. The question, too, of increasing the number of cars in freight trains, where the road is handling any considerable volume of freight traffic, is one of the greatest importance. If two heavy engines can be made to haul the same cars which formerly required the services of three lighter ones, then the wages of one engineer and fireman, together with interest on first cost and cost of maintenance of one engine can thereby be saved; likewise the wages of one freight conductor, and two or three brakemen. Moreover, the number of freight trains on the road is reduced in the ratio of three to two, and as most of the delays to traffic on single track come from this source, to wit, an overplus of through freight traffic, the trouble and expense attendant upon a crowded state of the road, and the expense and danger attendant upon train dispatching, together with the risk of accident and its attendant expense—all these items are reduced in even greater ratio.

Many of these advantages, though not all, follow from the use of two light engines on a long train in place of single engines and short trains, where powerful engines are not available.

There are two items of expense, especially on roads having a heavy freight traffic, which rarely receive attention; for while it is easy to see that they are sources of waste and unnecessary expense, the remedy is not so obvious. I refer, respectively, to coupling-links and pins, and to flat wheels on freight trains. It has been stated that in 1873 links and pins cost the Lake Shore Company \$50,000, truly an item worthy of some consideration. The discussion by Mr. J. M. Goodwin of the subject "Cost of Links and Pins," in the *Railroad Gazette* of Nov. 21, 1884, page 829, is commended to the manager seeking a remedy.

As for flat wheels, I am informed by a former superintendent of one of our New England roads that some three or four years since on his division they on the average sent to the shops four or five trucks per day on account of wheels too flat to be received by the connecting line. Of course, this means a considerable item of expense, and one chargeable wholly to carelessness of brakemen in sliding the wheels. Just how the evil can be checked is a question I am not now prepared to discuss, but the subject deserves attention from the careful manager. With clerk's wages at \$2 per day, how many clerks would this one item of expense represent?

Other subjects connected with retrenchment in trains and station service must be reserved for the next paper.

EDWIN A. HILL.

#### Car Steps.

At the West Albany shops of the New York Central they are putting a new style of step on all passenger cars that come in for repairs. They have 9 in. rise, but there are no regular risers. The back of the step is inclosed by a board set at an angle. The platform is reduced 8 in. in width. The top of the lower step comes within 13 inches of the top of the rail. The steps of the cars of this road have always been considered

particularly easy to reach from the rail level, but these are still easier. For stations where there are no platforms, and the cars have to be reached from the ground, this is a great improvement. As the new steps do not project any further than the old style, there is no difficulty in using them on the main line.—*National Car-Builder*.

#### Boston Terminal Facilities.

In a long and interesting article on the harbor of Boston and its present and prospective improvements, the *Boston Herald* gives the following account of the terminal facilities of the railroads in that city:

Having learned from the Land and Harbor Commissioners of the wonderful availability of Boston harbor for a system of docks which could accommodate an almost continental foreign commerce, it is perhaps proper that what has already been achieved and done to accommodate a large and growing commerce should be glanced at. It has been shown that Boston possesses tidal advantages in her natural deep water approaches which have been denied the other great seaport cities of the United States; and it may now be added that she has unrivalled terminal facilities for receiving and forwarding the products of foreign countries and of our own grain-producing West and Northwest, which are made readily and economically available by a conveniently central system of railroads, first-class docks, wharves, elevators and warehouses. The wharves of Boston are sheltered by commodious discharging sheds, which are entered by the tracks of the freight railroads, connecting the wharves with all the through fast freight lines of the United States and Canada, so that goods may be delivered directly to and received from the ships without delay or intermediate handling or carting, and without liability to weather damage. Few persons, it is safe to say, outside of those whose business and interests make such knowledge desirable or indispensable, are aware of the real character and extent of the improvements which have been made in the terminal facilities of Boston in the past 25 years, or even in the past decade. There are eight railway lines which have terminal grounds in Boston, and most of them connect directly or indirectly with the entire railway system of the United States, the Dominion of Canada and the Republic of Mexico. There are two local railways, one of which, the Grand Junction—which runs from Brookline around Boston to the harbor front of East Boston—is operated by the Boston & Albany Railroad Co.; and the other, the Union Freight Railway—which runs from the Fitchburg freight yards along the wharf front of the city proper—is operated by the Old Colony Railroad Co. There are, in and around Boston, and owned by the eight lines of railroad terminating here, about 546 acres of freight area, exclusive of the land which is occupied by freight and warehouses, hay and lumber sheds, elevators, pier sheds, coal runs, etc., etc.

#### THE BOSTON & ALBANY.

The land thus covered is often quite extensive in area, as may be illustrated in the case of the Boston & Albany Railroad Co. This company has a freight area of about 124½ acres, while its buildings in Boston and East Boston cover nearly 15 acres. The Boston & Albany terminal system, it may thus be judged, is quite an extensive one. It has an elevator in Boston, on Chandler street, with a capacity of 500,000 bushels, which is used for storage and local purposes almost exclusively. It has over 36 miles of side tracks for freight, about 15½ miles of which are in Boston, and about the same number in East Boston. The Grand Junction road, which is owned by the Boston & Albany Co., commences at Cottage Farm station, on the Boston & Albany road, and passes through Cambridgeport, East Cambridge, Somerville, Everett and Chelsea, to the yards and docks of the company in East Boston. The tracks of this road connect with the Fitchburg, the Lowell, the Boston & Maine (and the Eastern Division of the latter), and through the Lowell with the Massachusetts Central. The Boston & Albany Railroad has a water frontage in East Boston of 5,300 ft., has six docks, three of which have a frontage of 2,500 ft., and can accommodate six large ocean steamers at the same time. The other three docks are for the accommodation of coasters, coal vessels, etc. In the steamer docks there is, at ordinary low water, a depth of 25 ft. There are six piers at the Grand Junction yards, three of which are covered, and on the piers and grounds there are 17 other buildings, including bonded warehouses, coal run and elevator. The elevator at East Boston has a capacity of 1,000,000 bushels; can discharge 120 cars of grain per day; has 12 elevators for unloading cars; has six shipping elevators and can deliver 20,000 bushels per hour to vessels. It is alongside the dock, and delivers grain direct to vessels by the use of shipping-spouts. The proportion of grain delivered at this elevator for local use is very small, the bulk being for export and coastwise delivery. At the company's coal run vessels are discharged at the rate of 100 tons per hour.

#### THE BOSTON & LOWELL.

The Boston & Lowell Railroad Co. has about 67 acres of land devoted to freight purposes, 7 of which are in Boston, 29 in East Cambridge, and 31 at Mystic. The freight station at Charlestown, which fronts on the harbor at the mouth of the Mystic River, is connected with the main line by a branch track about 2½ miles in length, and is furnished with several miles of sidings. On the wharf are a capacious wooden freight house and a transfer elevator, which can deliver to vessels 4,000 bushels of grain per hour. The depth of water at the elevator berth is 24 ft. at low tide. On the wharf there are 10 berths, from each of which can be discharged 25 tons of coal per hour. Eight of these berths have a depth of 20 ft. at low water, and two have about 10 ft. There are three other berths, each with a depth of 20 ft. at low water. There are 29 coal pockets, having a capacity of 13,000 tons. Two Pennsylvania coal companies lease a portion of these terminal grounds, and have erected coal elevators, etc.

The Mystic freight yard is capable of accommodating 800 cars. The wharves at Mystic, fronting directly upon the harbor, will, when contemplated improvements are completed, furnish splendid facilities for foreign steamship accommodations, with some 2,000 ft. of berths.

#### THE BOSTON & MAINE.

The Boston & Maine Railroad has nearly 40 acres of land devoted to freight purposes in Boston, Somerville and Cambridge, but has no deep water terminal facilities of its own. It can, however, avail itself of the docks and elevators in Boston and East Boston, by means of the tracks of the Union Freight and the Grand Junction railways and also by the tracks of the Eastern road which it has leased. On its Mystic wharves in Somerville it has extensive coal pockets, freight houses, etc. The Eastern division of the Boston & Maine Railroad (the old Eastern Railroad), has an aggregate area for freighting purposes of nearly 77 acres, nearly all of which is in Boston and East Boston. The Eastern has dock facilities at East Boston for receiving and loading the largest ocean steamships and sailing vessels engaged in the carrying trade, though perhaps not such a monster steamer as the Cunard "Etruria." The two docks are dredged to 26 ft. depth at low water. The water frontage is 370 ft., and the width of the wharf, which

is covered, is 180 ft. The facilities for discharging and loading vessels at these docks are superior.

#### THE FITCHBURG.

The Fitchburg Railroad is one of our transportation companies which owns or connects directly with some of the best and most available terminal grounds in Boston. It owns in Boston and vicinity over 116 acres of freight yards, dock and wharf property. It has about 11 acres of freight houses, warehouses, elevator, covered piers, etc. Its Constitution wharf property has a frontage of 430 ft. on the harbor commissioners' line, and is one of the best located water-fronts on the harbor. It has a pier covering 131,540 square feet, and an area of docks of 52,000 square feet, in addition to the end berth. There are also berths at this wharf for the accommodation of three large ocean steamships, dredged to 25 ft. at low water. It has a large shed on the pier for receiving and discharging cargoes, covering 53,010 square feet, in which run the tracks of the Union Freight Railroad, thereby connecting this wharf with all the railroads and principal wharves in Boston. The company has also, at Constitution Wharf, an elevator with a capacity of 160,000 bushels, which can deliver to vessels at the rate of 4,000 bushels per hour, by the belt system, this being the first elevator in Boston to use that system. The company also owns Caswell's Wharf, which is situated between the Navy Yard and the Hoosac Tunnel Dock & Elevator Co.'s location, in the Charlestown District. This property, which is now under lease to private parties, is bonded for receiving and storing salt, iron and general foreign cargoes. About 51,000 square feet of the wharf are covered by iron-sheathed warehouses. The wharf on to which the tracks of the Fitchburg road run is also used as a shipping point for the exportation of ice. The docks have an area of 35,688 square feet, and have a depth, respectively, of 14, 15 and 18 ft. at low water. There are three berths at this wharf, and off the end berth there is a depth of 24 or 25 ft. at low water. The Fitchburg Co. connects with the Hoosac Tunnel Dock & Elevator Co.'s location in the Charlestown District, which possesses a plant covering about 15 acres, of which more anon. The Fitchburg Co. has railroad wharf facilities in Boston aggregating 5,650 ft. in length, of which 2,600 ft. is on Miller's River and 2,150 ft. on Charles River, and is used for the local trade.

This company, through its tunnel and northern connections, has direct connection with the vast system of western and northern roads of this country, Canada, Mexico, etc., and is destined to be one of the great freight-carrying and freight-delivery corporations of Boston's great and prosperous commercial future.

#### THE NEW YORK & NEW ENGLAND.

The New York & New England Railroad, which is the successor of several others that have operated its road, is one of the Boston railway lines which evidently has a great and prosperous future before it. It lacks, however, direct rail connection at its western end with the vast network of railways across the Hudson River, which would secure to it an immense carrying trade of products of the South and Southwest, as well as the West, not to mention the vast coal transportation it would naturally fall heir to. This connection will no doubt be made within a few years at most and then, not only will the double track of this road find full occupation, but its unrivalled terminal grounds on the Commonwealth flats at South Boston will be filled with freight for exportation abroad as well as with goods of importation destined to points in the interior on the lines of road and its connections. The company has within the city of Boston about 102 acres of terminal grounds, the most of which are located on the South Boston flats improvements. The dock system at these grounds is extensive, and, when completed, these docks, four in number, will be capable of accommodating 17 large steamships at one time. Two large docks, each 850 ft. in length, have been completed, one of which is dredged to 26 to 28 ft., and the other to 27 to 30 ft. at low water. There is a large elevator at the docks, with a capacity for storing 520,000 bushels of grain, which can deliver to two vessels at one time if required at the rate of 10,000 bushels to each per hour. The elevator can transfer 150 cars of grain per day, equivalent to 80,000 bushels of wheat or corn. With the old system of delivering grain it was necessary for the vessels to lay alongside the elevator and receive their cargoes through the spouts direct from the shipping bins; but with the rubber belt and the galley system in use in this company's elevator, a vessel can remain at her discharging berth, whether 200 or 1,475 ft. distant, and receive her cargo. The elevator building contains eight elevators capable of unloading eight cars of grain at once by the use of steam shovels. The time used in elevating a car load of grain is 10 minutes. The elevator building also contains three shipping elevators to receive from the bins and discharge to the six shipping bins, and thence to the rubber belts in the galleries. There are 88 bins in the elevator, capable of containing from 4,500 to 6,500 bushels. The company's water frontage, including all the docks, is 9,297 ft. The frontage on the harbor commissioners' line is 2,795 ft., all of which is available.

#### OTHER LINES.

The Boston & Providence Railroad Co. has a total land area in Boston for freight and passenger purposes of over 14 acres. It has no wharf property of its own on the harbor front, and owns no elevators or coal pockets, but it is connected with the other lines terminating in Boston by the Grand Junction road, and with the wharves and docks of the city through the Union freight railroad. It has a large and growing local freight traffic.

The Old Colony Railroad, or system of railways—for its lines cover nearly the whole of southern Massachusetts and extend across the state—has within the city limits about 13 acres of land used for freight purposes. It has a limited water front on Fort Point Channel, but no docks, elevators or wharves for loading large vessels. It is, however, connected with the wharf and dock system of the city, through the Union Freight Railway, which it operates. The Union Freight Railway Co. is a most important auxiliary to the terminal facilities of Boston, connecting, as it does, the various railway lines with the wharves in the city proper. It connects Constitution, Union, Eastern avenue, Lewis, Commercial and T wharves with all the railroads terminating in Boston, and by its system of tracks the freights of the several roads enter the spacious covered discharging sheds on the piers of the wharves named, and thereby avoid delays and damages consequent to bad weather. The company owns about 4½ miles of single track, and uses, in addition to its own, the tracks owned by some of the wharves and railroads in doing its general business. It is double tracked nearly all its extent on the line of the wharves, and has sidings and sheds for the storage of cars.

In addition to the wharves, docks and elevators belonging to and operated by the railroad companies, as already given, there are others which are operated by separate companies. Among these the most important in extent is the Hoosac Tunnel Dock & Elevator Co. The property of this company faces on the harbor between the Navy Yard and the Charles River bridge. The total area of this property is over 14½ acres. There are four piers and berths for four large ocean steamers, and the depth of water in the same at low tide is 25



<sup>7</sup> The decrease in through passenger-miles was 17 and in wa



9.7 per cent. The decrease in east-bound freight movement was 12.9 and in west-bound 21.3 per cent. Of the total movement 59 per cent. was east-bound and 41 per cent. west-bound.

The rates per ton-mile, in cents, compare as follows:

	1884.	1883.	Decrease.	P. c.
East-bound.....	0.623	0.735	0.112	15.2
West-bound.....	0.604	0.718	0.114	15.5
Average.....	0.613	0.726	0.113	15.4

The course of rates on the traffic of this road for 15 years past has been as follows:

Year.	Receipt per ton-mile.	Profit per ton-mile.	Receipt per ton-mile.	Profit per ton-mile.
1870.....	2.612	0.904	1.504	0.572
1871.....	2.808	0.869	1.391	0.478
1872.....	2.599	0.785	1.374	0.454
1873.....	2.542	0.694	1.335	0.389
1874.....	2.432	0.774	1.180	0.413
1875.....	2.387	0.554	1.010	0.273
1876.....	2.090	0.573	0.817	0.259
1877.....	2.319	0.672	0.894	0.291
1878.....	2.247	1.012	0.734	0.260
1879.....	2.223	1.049	0.642	0.244
1880.....	2.135	1.049	0.750	0.315
1881.....	1.988	0.868	0.617	0.203
1882.....	2.157	0.991	0.628	0.215
1883.....	2.196	0.918	0.728	0.276
1884.....	2.170	0.916	0.652	0.226

The earnings for the year were:

	1884.	1883.	Inc. or Dec.	P. c.
Freight.....	\$9,358,817	\$12,480,094	D. \$3,121,277	25.0
Passengers.....	4,133,729	4,736,088	D. 602,359	12.7
Mail and express.....	1,099,045	1,048,038	I. 51,007	4.9
Rents, etc.....	251,993	249,436	I. 2,557	1.0
Total.....	\$14,843,584	\$18,513,656	D. \$3,670,072	19.8
Expenses.....	9,133,592	11,001,833	D. 1,868,241	17.0
Net earnings.....	\$5,710,092	\$7,511,823	D. \$1,801,731	24.0
Gross earn. per mile.....	11.075	13.817	D. 2.742	19.8
Net.....	4.966	5.606	D. 0.640	11.3
Per cent. of exps.....	61.53	59.43	I. 2.10	3.5

Taxes are included in expenses, amounting to \$521,543 last year. Renewals included 8,135 tons steel rails, 667,804 new ties, 97.14 miles new fence and 123 miles of track ballasted.

The result of the year was as follows:

Net earnings, as above.....	\$5,710,092
Interest on funded debt.....	\$3,220,870
Rentals of leased roads.....	446,450
Dividends on guaranteed stock.....	53,350
Surplus, 4.02 per cent. on stock.....	\$1,989,392
Dividends paid, 5 per cent.....	2,473,325
Deficit.....	\$483,833

In 15 years the company has paid 86 per cent. in dividends, an average of 5.73 per cent. yearly. The dividends earned and paid during this period have been as follows:

Deficit.....					\$483.83
In 15 years the company has paid 86 per cent. in dividends, an average of 5.73 per cent. yearly. The dividends earned and paid during this period have been as follows :					
Earn'd. Paid.		Earn'd. Paid.		Earn'd. Paid	
1870....	9.60 8	1875....	2.20 394	1880....	11.28 8
1871....	8.37 8	1876....	3.26 394	1881....	8.02 8
1872....	8.55 8	1877....	3.57 2	1882....	8.37 8
1873....	6.19 4	1878....	5.61 4	1883....	8.11 8
1874....	6.04 394	1879....	7.24 04	1884....	4.02 5

The directors' report says: "The funded debt is now \$46,192,000. This is an increase of \$3,250,000, caused by the sale of \$5,500,000 of the consolidated second-mortgage bonds (for \$4,000,000) less the regular annual amount of \$250,000 for the sinking fund."

"By vigorous and determined economy the operating expenses show a reduction of 16.98 per cent. While the freight train mileage shows a large reduction—5,828,746 miles in 1884, 7,176,597 miles in 1883—by reason of the competition by new lines, on both through and local passenger business, the mileage of passenger trains show a small increase, being 3,459,742 miles in 1884, against 3,403,224 miles in 1883.

"The property has not been allowed to deteriorate, but has been, as a matter of true economy, fully maintained; and some improvements in bridges, buildings, equipment, new side tracks, etc., are included in the operating expenses, nothing being charged to construction.

"Notwithstanding the large falling off in earnings—nearly 20 per cent.—the per cent. of operating expenses, including all taxes, was kept down to 61.53. The per cent. for 1883 was 59.43, and for 1882, 60.67.

"For the first quarter of the year the dividend was 2 per cent., which was somewhat in excess of net earnings, the hope being entertained that the succeeding quarters would show an improvement sufficient to overcome the deficiency. At the end of the second, however, this hope had not been sufficiently realized, and it was deemed judicious to reduce the dividend to 1½ per cent., as stated in the semi-annual circular sent out to stockholders at end of June. For the third quarter a dividend of 1½ per cent. was paid, making in all 5 per cent. At the end of the year the usual statement of business was issued to the stockholders (December being estimated), which showed only a trifling over 4 per cent. earned for the stock during the year; and as the dividends already paid appeared at some \$485,000 in excess of the earnings applicable, it was decided to pay no dividend for the last quarter.

"New leases have been entered into with the Jamestown & Franklin and the Mahoning Coal Railroad companies, which are active feeders to its line."

#### New York, Chicago & St. Louis.

This company owns and operates a railroad from Buffalo to Chicago, as follows:

	Miles
Main line owned, Buffalo, N. Y., to Grand Crossing, Ill.....	512.52
N. Y., L. Erie & Western tracks used in Buffalo.....	1.60
Lake Shore & Mich. So., Grand Crossing to Chicago.....	8.90

Total miles operated..... 523.02

In addition to the miles of main line owned by the company, as stated above, there are 6.24 miles of second main track and 95.02 miles of side track, making in all 613.78 miles owned, of which 562.64 miles are laid with steel rails and 51.14 miles with iron rails. The report is for the year ending Dec. 31.

The equipment (all held under trust or mortgage) consists of 108 locomotives; 34 passenger and 14 baggage and mail cars; 5,000 box, 700 coal, 210 flat, 1,200 flat and 80 caboose cars; 1 officers' car, 1 pay car, 4 derrick cars and 1 snow-plow. Additions made last year were 500 box cars, 4 derrick cars and 1 snow-plow.

The general account, condensed, is as follows:

Capital stock, common.....	\$28,000,000
Preferred.....	22,000,000
Funded debt.....	20,046,000
Current liabilities.....	4,321,387
Total.....	\$74,367,887
Road and equipment.....	\$70,844,032
Deferred assets (material, claims, etc.).....	1,108,118
Current assets, cash and receivables.....	1,672,380
Income account.....	1,892,457
Total.....	\$74,367,887

The funded debt includes \$15,000,000 firsts, \$1,046,000 second and \$4,000,000 equipment bonds.

The floating debt, Dec. 31, 1884, as compared with the previous year, was:

	1884.	1883.
Bills payable.....	\$2,850,000	\$3,109,241
Unpaid vouchers.....	488,980	308,077
Unpaid pay-rolls.....	128,584	114,105
Due to other railroad companies.....	106,637	96,717
Due to W. K. Vanderbilt and others.....	119,159	452,410
Coupons matured, but not presented.....	457,220	157,000
Interest on fund, debt accrued, not due.....	165,920	157,000
Miscellaneous liabilities.....	5,507	131

Total..... \$4,321,887 \$4,167,681  
Floating assets..... 1,470,131 956,116  
Net floating debt..... \$2,851,756 \$3,211,565

This statement shows a decrease in net floating debt of \$359,809 during the year. This is only apparent, however, as the floating assets for 1884 include \$346,964 due from Grant & Ward, which can hardly be called an asset.

The traffic for the year was as follows:

	1884.	1883.	Inc. or Dec.	P. c.
Train miles pass.....	481,207	469,840	I. 11,367	2.4
Tr. miles freight.....	2,498,893	1,465,355	I. 1,033,538	70.6
Passenger car.....	475,274	423,007	I. 52,267	12.4
Passenger-miles.....	14,610,449	11,658,787	I. 2,951,662	25.3
Tons freight car.....	1,702,773	981,830	I. 720,943	73.5
Ton-miles.....	604,371,112	333,630,582	I. 270,740,530	81.1

At train load:  
Passenger, No..... 30 25 I. 5 20.0  
Freight, tons..... 242 227 I. 15 6.6

Average rates:  
Per passenger-mile..... 1.680 cts. 1.990 cts. D. 0.310 ct. 15.6  
Per ton-mile..... 0.476 " 0.600 " D. 0.124 " 20.7

The extremely low average freight rate shows the large proportion of through freight included in the tonnage.

The earnings for the year were:

	1884.	1883.	Inc. or Dec.	P. c.
Freight.....	\$2,879,309	\$2,000,561	I. \$878,748	43.8
Passengers.....	246,186	232,624	I. 13,562	5.8
Mail and express.....	57,175	7,802	I. 49,373	633.0
Miscellaneous.....	34,021	86,696	D. 52,675	71.0
Total.....	\$3,207,591	\$2,327,683	I. \$879,908	37.8
Expenses.....	2,389,234	1,689,294	I. 699,940	41.4

Net earnings..... \$818,357 \$638,389 I. 179,968 28.2  
Gross earn. per mile..... 6.133 4.451 I. 1.682 37.8  
Net..... 1.565 1.221 I. 0.344 28.2  
Per cent. of exps..... 74.0 72.6 I. 1.4 1.9

In 1883 there were no receipts for mails. The road runs no through passenger trains, and its passenger receipts are entirely from local business. Taxes are included in expenses.

The direct result of the year was as follows:

Net earnings, as above.....	\$818,357
Interest, funded debt.....	\$1,228,368
unfunded debt.....	123,551
Rentals of terminals.....	90,000
Deficit for the year.....	\$623,562

The interest charges were, on first-mortgage bonds, \$900,000; seconds, \$48,368; equipment bonds, \$280,000; total, \$1,228,368.

The following table shows the resources of the year:

Net earnings (over rentals).....	\$728,357
Increase of second mortgage bonds.....	456,000
Sale of stock of Cincinnati, Hamilton & Dayton RR. Co.....	569,154
Reduction of amount held by equipment bond trustees.....	255,474
Dividend on stock of Cincinnati, Hamilton & Dayton.....	14,592
Special deposit withdrawn from Metropol. Nat. Bank, N. Y.....	75,000
Increase of floating liabilities.....	154,206
Total.....	\$2,242,785

This shows that the company issued \$446,000 second-mortgage bonds last year, and also realized on certain assets. The Cincinnati, Hamilton & Dayton stock, bought at the same time the Erie made its purchases, was, apparently, all sold. The resources were disposed of as follows:

Construction.....	\$88,646
Equipment.....	251,650
Interest, funded and floating debt.....	1,351,770
Rocky River bonds bought.....	35,754
Contribution to Nickel Plate Line fund.....	1,000
Increase of floating assets.....	514,015
Total.....	\$2,242,785

The President's report, complete, is as follows: "The past year has been one of unusually low rates, owing to the continued difficulties between the Trunk Lines. The road has been operated at a less expense per ton-mile than any road in the country, owing to the practice of all possible economies, and to the fact that no renewals have been required. In the near future, however, large renewals will have to be made, especially of ties and timber structures.

"Since the close of the year 1884, the road has been unable to earn sufficient money to pay its fixed charges, and in consequence a receiver has been appointed for the property."

#### Norfolk & Western.

This company owned and worked, at the close of its last fiscal year, Dec. 31, 1884, a main line from Norfolk, Va., to Bristol, 408 miles; the City Point Branch, 10; the Saltville Branch, 10; the New River Division, New River to Pocahontas, 75; the Flat Top Extension, 7; a total of 510 miles, with 82.3 miles of sidings.

The Flat Top Extension was not completed until very near the close of the year, so that its mileage is not included in calculating the averages given below.

The equipment includes 120 locomotives; 33 passenger, 2 sleeping, 2 combination, 10 baggage and 7 mail cars; 1,160 box, 295 stock, 1,917 gondola and 72 caboose cars; 2 officers' cars, 1 pay car, and 130 road and service cars; 116 hand and pole cars; 374 transfer trucks. Additions last year were 7 locomotives; 224 box, 96 stock and 847 gondola cars.

The capital account was as follows at the close of the year 1884, as compared with the previous year:

	1884.	1883.
Capital stock, preferred.....	\$18,000,000	\$18,000,000
common.....	7,000,000	7,000,000
Funded debt.....	16,850,600	12,784,600
Lease warrants on rolling stock.....	1,651,812	1,916,894
Collateral loan.....	50,000	1,000,000
Accrued interest on funded debt.....	206,285	347,296
Bills payable.....	241,710	388,202
Accounts payable (current balances).....	307,507	480,624
Dividend No. 5, payable in scrip.....	525,000	525,000
Surplus of income.....	513,300	339,191

Total.....	\$44,911,394	\$42,681,812
Railroad property and franchises.....	33,114,853	29,415,276
Rolling stock.....	2,237,959	1,919,297
Car trucks.....	1,651,812	1,916,893
Materials and supplies.....	107,836	153,358
Stocks and bonds owned (cost).....	6,687,988	8,732,400
Loans to Shenandoah Valley Co.....	835,000	200,000
Bills receivable.....	310,700	164,669
Accounts receivable (current bal.).....	313,744	210,474
Cash.....	149,413	329,418
Total.....	\$44,911,394	\$42,681,812

The item of stocks and bonds owned includes \$4,057,100, par value of common stock issued in exchange for Shenandoah Valley stock.

The funded debt includes \$4,085,000 prior first divisional bonds; \$6,689,000 general mortgage; \$3,000,000 New River Division firsts; \$1,500,000 improvement and extension; \$1,500,000 adjustment mortgage and \$255,000 convertible debentures; a total of \$16,900,000, on which the yearly charge is \$1,023,686. There are also in the company's treasury \$541,000 improvement and extension bonds unsold, bringing the total amount up to \$16,850,000, as above. Changes last year are noted elsewhere.

The traffic for the year was as follows:

	1884.	1883.	Inc. or Dec.	P. c.
Pass. train miles.....	501,076	485,927	I. 15,149	3.1
Freight.....	1,733,470	1,735,746	D. 2,276	0.4
Locomotive miles.....	2,402,393	2,313,793	I. 88,600	3.8
Pass. car miles.....	2,863,553	2,508,815	I. 354,738	14.2
Freight.....	20,436,655	19,122,738	I. 1,313,917	6.9
Passengers carried.....	412,452	307,627	I. 104,825	33.9
Passenger-miles.....	19,213,251	18,285,288	I. 927,963	5.1
Tons freight car.....	892,512	797,555	I. 94,957	12.0
Ton-miles.....	171,773,275	155,521,709	I. 16,251,566	10.4

At train load:  
Passenger, No..... 33 34 D. 1 D. 2.9  
Freight, tons..... 90 80 I. 10 12.5

Locomotive service cost 24.07 cents per mile run. The decrease in freight train mileage was due to the increased use of consolidation engines.

The earnings per passenger and ton-mile are given as follows in cents:

	1884.	1883.	1884.	1883.
Earnings, local.....	2.793	3.106	1.285	1.664
" through.....	2.304	2.324	1.054	1.184
" all.....	2.713	2.963	1.179	1.403
" other sources.....	0.649	0.832	0.023	0.006

Total..... 3.362 3.815 1.202 1.409  
Expenses..... 1.963 1.925 0.663 0.769

Profit..... 1.399 1.890 0.539 0.640

The average passenger journey last year was 46.6 miles, and the average freight haul was 192.5 miles, against 52.9 and 195.1 miles in 1883.

The earnings for the year were:

	1884.	1883.	Inc. or Dec.	P. c.
Freight.....	\$2,025,087	\$2,181,711	D. \$156,624	7.2
Passengers.....	521,191	485,805	I. 35,386	7.3
Mail and express.....	117,686	122,681	D. 4,995	4.1
Other.....	47,189	22,580	I. 24,609	109.0

Total..... \$2,711,153 \$2,812,777 I. \$101,624 3.6  
Expenses..... 1,516,858 1,509,574 I. 7,284 0.5

Net earnings..... \$1,194,295 \$1,303,203 D. \$108,908 8.4  
Gross earn. per mile..... 5.390 5.949 D. 0.559 10.3  
Net..... 2.374 2.736 D. 0.362 13.2  
Per cent. of exps..... 55.9 53.7 I. 2.2 3.9

Expenses include taxes paid, which amounted to \$80,004 last year and \$72,000 in 1883. The decrease in earnings was due entirely to the reduction in rates.

The result of the year was as follows:

Net earnings, as above.....	\$1,194,293
Interest, funded debt.....	\$847,277
" car trust obligations.....	63,993
" discount, etc.....	42,167
Sundry extraordinary charges.....	66,662





Published Every Friday.

## EDITORIAL ANNOUNCEMENTS.

**Passes.**—All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

## THE LAKE SHORE REPORT.

The Lake Shore & Michigan Southern report for 1884 shows even a greater decrease in earnings than the Michigan Central, on which we commented last week, but it comes in a different way. The Michigan Central had a decrease of 8½ per cent. in passenger traffic, but an increase of 3 per cent. in freight traffic, and the reduction in its earnings and profits was chiefly due to a decrease of 22 per cent. in its average freight rate. Now, the Lake Shore's freight rate decreased only 10½ per cent., but its freight traffic fell off no less than 16½ per cent. and its passenger traffic decreased 11½ per cent., or considerably more than the Michigan Central's. The result was that the latter's freight earnings fell off 19½ per cent. and the Lake Shore's 25 per cent.

The average freight rate was nearly the same on both roads last year (Michigan Central, 0.646 cent per ton per mile; Lake Shore, 0.652 cent), while in 1883 the Michigan Central's was the higher by a seventh.

While the total decrease in the gross earnings of the Lake Shore last year was 20 per cent., amounting to \$3,670,072, the decrease in passenger earnings was 14½ per cent. and in freight earnings 25 per cent., and out of the \$3,000,000 decrease in freight earnings \$2,000,000 was due to the decrease in traffic.

But we need to go back more than one year to find how severely the Lake Shore's traffic suffered, and how much more than the Michigan Central's. For the Lake Shore's traffic has been decreasing ever since 1881, and was smaller last year than in any other since 1878, while the Michigan Central's was larger last year than ever before except in 1880. Since 1881 the Lake Shore's freight traffic has decreased no less than 30 per cent., but in that time the Michigan Central's has increased 9½ per cent. In passenger traffic the two roads have more nearly kept pace with each other. Both traffics may be compared below, where the figures are for millions of passenger and ton-miles:

	1878.	1879.	1880.	1881.	1882.	1883.	1884.
Pass.-miles.	133.7	141.2	176.1	208.0	227.1	215.7	190.5
Mich. Cen. ...	108.6	126.8	160.0	176.0	188.8	180.7	164.9
Ton-miles.	1,340.5	1,733.4	1,851.2	2,021.8	1,892.0	1,609.5	1,410.6
Lake Shore ...	841.8	1,166.3	1,190.1	1,078.0	1,146.4	1,141.3	1,179.2

In 1880 the Lake Shore had 55½ per cent. more freight traffic than the Michigan Central; in 1881, 88 per cent. more, and even in 1883 48 per cent. more; last year only 19½ per cent. more.

The Lake Shore does not report through traffic separately, as the Michigan Central does, and we therefore cannot say just what was the decrease in through and in local traffic. The Michigan Central had a decrease of but 7 per cent. in local freight, and in all probability the Lake Shore's loss was chiefly in through freight. And this will explain why the decrease in its average rate was so much less than the Michigan Central's. A much larger proportion of the Lake

Shore's freight was local last year than in 1883, while of the Michigan Central's 44½ per cent. was local last year against 49½ per cent. in 1883. Low as was the Lake Shore's average rate last year, it was higher than that in 1882, 1881 or even 1879, and the reason doubtless is that the traffic which it has lost is through traffic chiefly, and this has made the proportion of its through traffic smaller than heretofore. Its through rates must have been about the same as those of the Michigan Central and other railroads, and lower than in any other year except possibly 1881. A large part of its decrease in traffic has gone to the New York, Chicago & St. Louis, which carried, with only 39 per cent. of the Lake Shore's mileage of road, 43 per cent. of its freight traffic (but only one-thirtieth of its passenger traffic). Taking the two roads together, their freight traffic was 2,015 millions of ton-miles last year and 2,023 in 1883, while the Lake Shore's largest traffic, before the days of the Nickel Plate, was 2,022 millions of ton-miles, in 1881.

A little more than one-half of the Lake Shore's decrease in gross earnings last year was offset by a decrease of 17 per cent. in working expenses, amounting to \$1,868,332. Of this decrease \$1,045,410 was in maintenance expenses, the percentage of decrease in them being no less than 23½ per cent. The items in which the decrease is especially large are repairs of buildings and fixtures, 37½ per cent.; rail renewals, 41 per cent. (bringing the cost down to \$86 per mile of track); repairs of roadway and track, 25 per cent.; repairs of locomotives, 34 per cent.; repairs of freight cars, 34 per cent. The cost of repairs of freight cars is brought down to \$24½ each; of repairs of locomotives to \$923 each. In some of these items there was a considerable decrease from 1882 to 1883, especially in rail renewals, but the total decrease in maintenance expenses then was less than 5 per cent. The decrease from 1882 to 1884 is 32 per cent. The decrease in traffic favored the large decrease last year, but these expenses were probably less than they can be kept hereafter.

With this decrease of earnings and expenses there was an increase in fixed charges, and the surplus over them fell from \$4,012,996 in 1883 to \$1,989,392 in 1884, and the surplus per share from \$8.11 to \$4.02.

This, however, does not take into account \$420,487 paid out during the year "in settlement of Cawood swage block patent judgment, judgment for dividends on guaranteed stock, 1857 to 1863, and other old claims." These were all properly chargeable against income. They belong to the accounts of previous years, but having to be paid, they lessen the amount of profit available for dividend. As reported, the net earnings were 54 per cent. in excess of the fixed charges. There is, therefore, room for a large further decrease in the net earnings before dividends are entirely destroyed. The conditions are such that a considerable further decrease seems inevitable. The four months of 1885 have been decidedly more unfavorable than the corresponding period last year, when the Lake Shore's profits above fixed charges were about at the rate of \$3.75 per share per year. Better through rates can alone make this year even as profitable as last.

## THE CALCULATION OF THE EFFICIENCY OF BRAKES.

We have received recently an interesting report of a series of freight brake tests, which has suggested that it may be of interest to compare the various records of freight train stops which have been published from time to time in these columns and elsewhere, determining so far as is possible to what extent the brakes have been efficient, or in what direction the records reveal that they have been most deficient. Before attempting this, however, it seems desirable to determine the simplest and best method of computing the efficiency of brakes from the records of stops, and also to determine a certain standard for their efficiency, from records of stops by hand brakes on the one hand and of the most perfect forms of power brakes on the other.

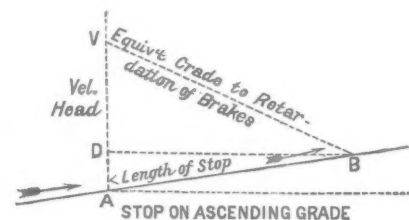
By the aid of Table II. herewith the ordinary process of computation, which is otherwise somewhat cumbersome, is greatly facilitated; so that any one familiar with arithmetic can compute understandingly the efficiency of any brake within a very trifling fractional error—considerably closer than it is ordinarily customary to compute them, even in careful tests. For some inscrutable reason, no table of this kind, nor anything very closely approaching it, is to be found in any of the text-books or pocket-books; a fact the more singular as the table is very useful for many other computations in which variations in the speed of trains have to be considered, as notably in computing the effect on hauling capacity of short or undulating gradients. Neither is the process of com-

putation by any method given in many of the books in the hands of railroad men, so that those not accustomed to such computations, it would seem, in some cases hesitate to attempt it: a hesitation which is both unnecessary and unfortunate.

The bare rule for using the table referred to, divested of all explanation, is given beneath it. The principle of the process is as follows:

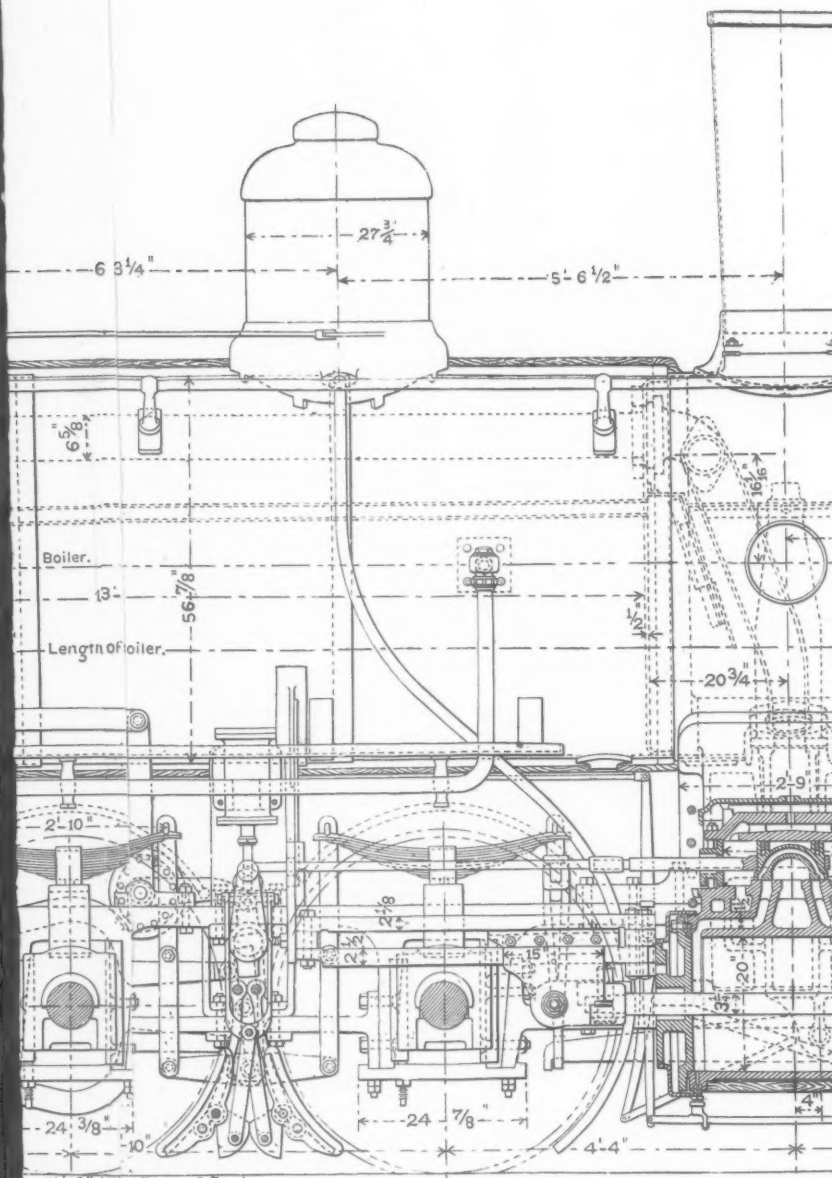
When a train is stopped by brakes on a level grade, the forces impelling it forward are (1), and chiefly, the accumulated energy, or so called *momentum* of the train, and (2) the rotative energy of the wheels, which is in addition to that due to the linear velocity of the train as a whole.

This energy is expressible in several ways. It is usually computed in what is called "foot-pounds of work," but it is perfectly expressed by (what is the same thing in effect) the number of *vertical feet*

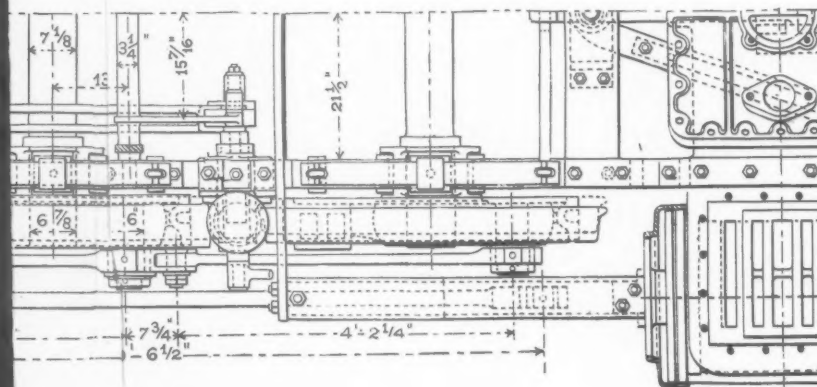








5. 21'-6" Wheel Base of Engine.  
 7/16 Total Wheel Base of Engine and Tender.



FOR THE NORFOLK & WESTERN RAILROAD.

MACHINE WORKS, at Roanoke, Va.



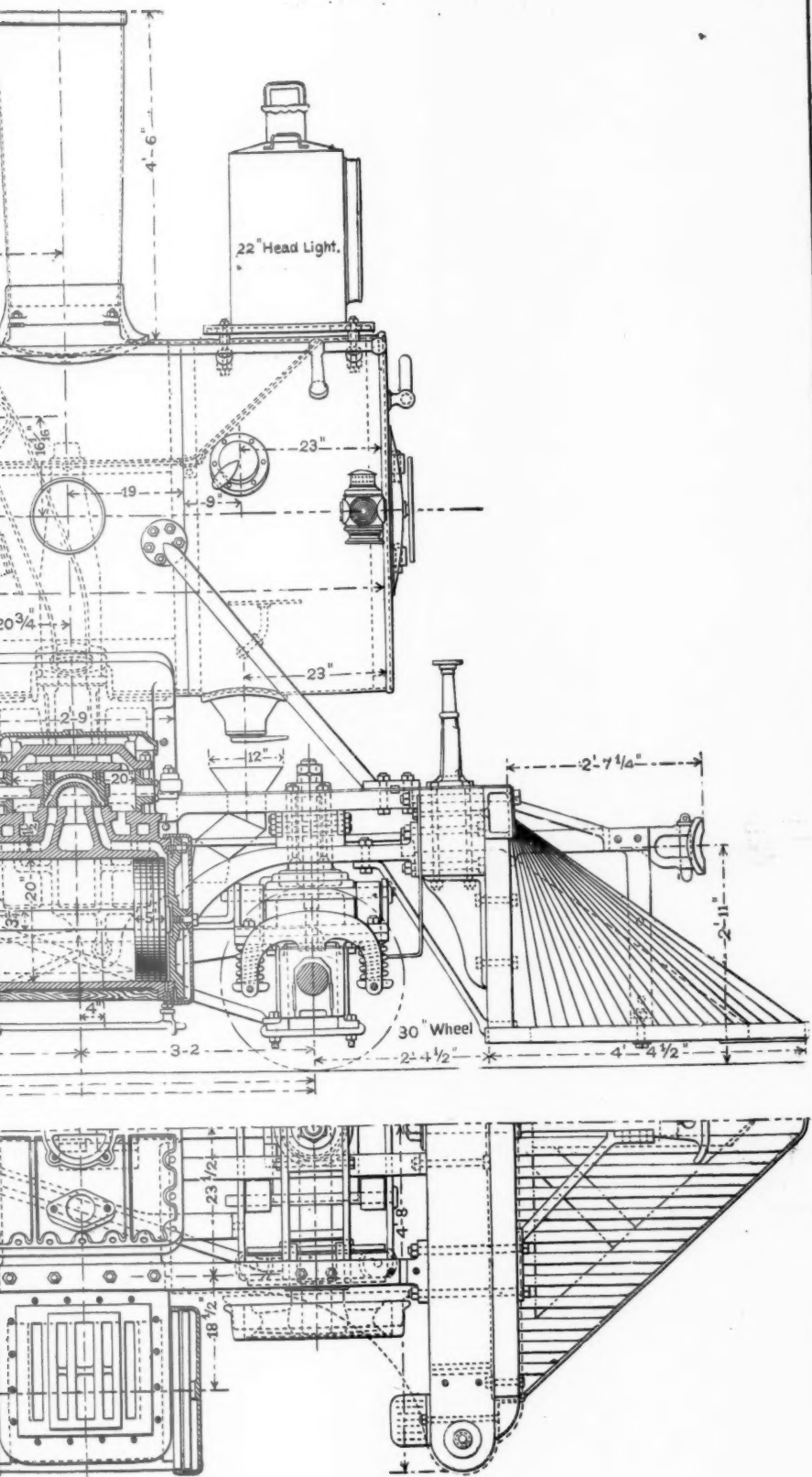






TABLE I.

Giving the Height in Vertical Feet through which a Body must Fall to acquire a Given Velocity in Miles Per Hour, or the Height through which the energy due to that Velocity will lift the Body against gravity only before it comes to rest.

MILES PER HOUR.	0.	1.	2.	3.	4.	5.	6.	7.	8.	9.
0.....	0.00	0.03	0.13	0.30	0.54	0.84	1.20	1.64	2.14	2.71
10.....	3.34	4.05	4.82	5.65	6.55	7.52	8.56	9.67	10.84	12.07
20.....	13.38	14.75	16.19	17.69	19.26	20.90	22.61	24.38	26.22	28.13
30.....	30.10	32.14	34.25	36.42	38.66	40.97	43.34	45.78	48.29	50.87
40.....	53.51	56.22	58.99	61.84	64.75	67.72	70.77	73.88	77.05	80.30
50.....	83.61	86.99	90.43	93.94	97.52	101.17	104.88	108.66	112.50	116.42

$$\text{Formula: } h = \frac{\left(\frac{5280}{60 \times 60}\right)^2 V^2}{64.32} \quad V^2 \text{ (miles per hour)} = 0.033445 V^2$$

TABLE II.

Table of the Total Energy of Potential Lift in Trains Moving at Various Velocities. Including the Effect of the Rotative Energy of the Wheels for Passenger or Loaded Freight Trains, assumed at 6.14 per cent. of the total energy. For trains of empty flat or coal cars add about 4 per cent. to the quantities below, and proportionately for mixed trains.

MILES PER HOUR.	0.	1.	2.	3.	4.	5.	6.	7.	8.	9.
0.....	0.00	0.04	0.14	0.32	0.57	0.89	1.28	1.74	2.27	2.88
Diff's.....	.04	.10	.18	.25	.32	.39	.46	.53	.61	.67
10.....	3.65	4.30	5.11	6.00	6.96	7.99	9.09	10.26	11.50	12.82
Diff's.....	.75	.81	.89	.96	1.03	1.10	1.17	1.25	1.32	1.38
20.....	14.20	15.67	17.19	18.79	20.46	22.20	24.00	25.88	27.83	29.86
Diff's.....	1.47	1.52	1.60	1.67	1.74	1.89	1.88	1.95	2.03	2.09
30.....	31.95	34.12	36.35	38.66	41.04	43.49	46.01	48.60	51.26	54.00
Diff's.....	2.17	2.23	2.31	2.38	2.45	2.52	2.59	2.66	2.74	2.80
40.....	56.80	59.68	62.62	65.64	68.73	71.89	75.12	78.42	81.79	85.24
Diff's.....	2.88	2.94	3.02	3.09	3.16	3.23	3.30	3.37	3.45	3.51
50.....	88.75	92.34	95.99	99.72	103.52	107.39	111.33	115.34	119.42	123.58
Diff's.....	3.59	3.65	3.73	3.80	3.87	3.94	4.01	4.08	4.16	4.22
60.....	127.80	132.10	136.46	140.90	145.41	149.99	154.64	159.36	164.15	169.02
Diff's.....	4.30	4.36	4.44	4.51	4.58	4.65	4.72	4.79	4.87	4.93
70.....	173.95	178.96	184.03	189.18	194.40	199.69	205.05	210.48	215.98	221.56
Diff's.....	5.01	5.07	5.15	5.22	5.29	5.36	5.43	5.50	5.58	5.64

$$\text{Formula: Vel. head} = \frac{v^2 \text{ in ft. per sec.}}{64.32} = \frac{1.467^2 V^2 \text{ (in miles per hour)}}{64.32} = 0.033445 V^2$$

$$\text{To which add 6.14 per cent. for rotative energy of the wheels} = 0.002055 V^2$$

$$\text{Giving as the final formula, by which the table is computed, Vel. head} = 0.035500 V^2$$

The process of computing the result of a brake-test by the aid of this table is as follows:

FIELD NOTES REQUIRED.—1. Speed in miles per hour at instant of applying brakes.

2. Distance run after applying brakes, in feet.

3. Rate of grade, ascending or descending, in per cent., i. e., feet per station of 100 ft.

4. Proportion of the total weight of the train to which brakes were applied. (Except as necessary to determine this proportion, the total weight of the train, or the total weight on braked or unbraked wheels, is unessential and does not enter into the computation.)

To these essential notes should preferably be added:

5. Time of stop in seconds (best taken with a stop-watch).

PROCESS OF COMPUTATION: 1. Take from the table the height in vertical feet corresponding to its speed, i. e., the "Vel. head"  $V$ , figs. 1 and 2. Divide it by the length of the stop in "stations" of 100 ft. The quotient (which will in all ordinary cases be between the extreme limits of 2.00 and 20.00) is the equivalent grade of retardation for a stop on a level grade.

To this quotient add the actual rate of grade, if descending, or subtract it, if ascending. Subtract also the grade representing the average train resistance during the entire stop, which may be approximately assumed as follows:

Initial speed.....	25	30	40	50	55	60
and less.....						

Average resistance during stop...	8	9	10	12	14	18

Equivalent grade.....	0.4	0.45	0.5	0.6	0.7	0.8

3. The resulting sum or difference is the actual equivalent grade of retardation, in feet per 100: or the effect of the brakes as a whole on the train as a whole. The figures expressing this grade, as 5.00, 8.50, 12.45, express also the efficiency of the brakes upon the train as a whole, in percentages of the total weight of the train.

4. Divide this grade or percentage by the per cent. of the total weight of the train upon which brakes acted or were adapted, intended or expected to act. The quotient is the actual efficiency of the brakes upon the load carried by the braked wheels, or upon that portion thereof which it was intended to rely upon in proportioning the brakes.

This quotient will always lie between the extreme limits of 25.00 and 1.00, usually between 3.00 and 14.00, and is the only one by which comparisons with different trains having differently distributed brakes can properly be made.

By formula: Grade of Retardation =  $\frac{\text{Vel. head}}{\text{Distance}} + \frac{\text{rate of descending grade}}{\text{Distance}} - \text{grade of rolling friction.}$

and  $\frac{\text{p. c. of wt. of train on which brakes acted}}{\text{Grade of retardation}} = \text{Efficiency of brakes in per cent. of weight on which they acted.}$

EXAMPLE: 1. Train with  $\frac{3}{4}$  (75 per cent.) of weight braked; 20 miles per hour; 2.84 ft. (284 stations) distance run; grade, 52.8 ft. per mile (1.0 per cent.) descending.

Assumed average grade of rolling friction, as above, = 0.4.

Then  $\frac{14.20 \text{ (from table)}}{2.84} = 5.00 + 1.00 - 0.4 = 5.6, + 0.75 = 7.47;$

being the percentage of the efficiency of the brakes or rate of an equivalent grade; and grade of  $7.47 \times 20 = 159.4$  lbs. per ton retarding force from brakes.

2. Train 80 per cent. braked; 60 miles per hour; 1,014 ft. length of stop. Grade, 26.4 ft. per mile (0.5 per cent.) ascending.

Assumed average grade of rolling friction, as above, = 0.8.

$\frac{127.80 \text{ (from table)}}{10.14} = 12.60 - 1.00 - 0.8 = 10.80; + 0.90 = 12.00.$

higher grade, varying from 0.75 to 0.9 per cent. (40 to 48 ft. per mile), or 15 to 18 lbs. per ton.

Without now attempting any detailed investigation of the proper allowance for this train friction, which would lead us too far, estimates are given below Table II., which are, perhaps, sufficiently approximate for all practical purposes, although probably too low, as it seems desirable that they should be, if they are to err at all, in order not to underrate the efficiency of the brakes; a possible injustice which would tell most on those least efficient.

This "grade of repose," having been deducted from the "equivalent grade of retardation," as above determined, leaves a final grade which represents the true work done by the brakes only upon the train as a whole. As the proportion of the weight of the train to which brakes are applied varies greatly, however, a final step remains: to determine the percentage of the efficiency of the brakes per ton to which the brakes were applied. If only half (0.5) or one-third (0.33) of the weight of the train had brakes applied to it, and the grade of retardation above determined was 5.00 per cent., the efficiency of the brakes had they been applied with equal force to the whole train would be  $5.00 \div 0.5$  or  $5.00 \div 0.33 = 10.00$  or 15.00, which latter consequently represent the actual efficiency of the brake in the form of a percentage of the load carried by the braked wheels only, or of

that portion thereof which it was contemplated to rely upon in proportioning the brakes. In ordinary freight brakes this is only the weight of the car itself when empty.

Examples which show how much quicker and simpler this process is than the verbal description are given beneath Table II., and need not be here repeated. The only steps in it which appear to require further explanation, even to those not much accustomed to such computations, are in the manner of determining what has been termed the "velocity head." This rests upon one of the simplest principles of mechanics, viz., that a body in motion at a given velocity in whatever direction it is moving, or from whatever source its motion be derived, has in it the same amount of energy or potential work per unit of weight. If it has fallen freely through a space of 10 ft., i. e., has been acted on by a force equal to its weight for a distance of 10 feet, it will have acquired a velocity of about 17½ miles per hour, or 25.4 ft. per second, and this velocity or accumulated energy will suffice to lift the body against gravity, if directed to that end, over any vertical or inclined path, through a vertical height equal to that through which it fell to acquire that velocity. Similarly, if the body (as for instance a train of cars) has been acted on by the pull of the locomotive, or by dropping down a grade, or by an impact, or by power from any other

source, so that it is moving through space in any direction, vertical, horizontal or inclined, with a velocity of 17½ miles per hour, this velocity also can be made by appropriate contrivance to do the same amount of work upon the body, i. e., lift it through 10 feet vertically, or do other work equivalent thereto. The locomotive, to give this velocity, must act through a much longer distance than the 10 feet required by gravity, since its force is very much less than gravity even when it is required only to move itself; but in whatever manner, and in whatever time and in whatever direction, curved or straight, the velocity be acquired, it represents the same amount of accumulated energy, viz., 10 foot-pounds per pound weight of the body, and hence can be made to do the same amount of work, or rather will and must do so in some form before the motion will be destroyed.

Conversely, if a body is known to have had the given velocity (17½ miles per hour), and has been brought to rest by a given force, we know that that force must have done work upon the body equal to destroying 10 foot-pounds of work per pound of weight, or to lifting the body 10 ft. vertically. If it did this in a horizontal distance of 100 ft., it exerted the same effect as if the body had been moving on an inclined plane rising 10 ft. vertically in 100 ft. horizontal. If it did it in a horizontal distance of 1,000 ft. it exerted the same effect as if the body had been moving on a plane rising 10 ft. in 1,000, or 1 in 100, etc. On this simple principle the whole process of computing the work done by brakes rests.

The stored up energy in a moving body is in proportion to the square of its velocity. If it be moving at 20 or 30 miles per hour, it will have 4 (2²) or 9 (3²) times the accumulated energy that it would if moving at only 10 miles per hour. To acquire that velocity it must fall through four times or nine times as great a height, or be acted on by any other force for four times or nine times as great a distance. Gravity, acting with its full force or on a body falling freely, will give it a velocity of 50 miles per hour in a distance of 83.61 ft. A locomotive exerting a pull (in excess of the frictional resistances) of 20 lbs. per ton or 1-100 part of its weight, or a descending grade communicating the same force to a car, will take 100 times as great a distance, or 8,361 ft., to give the same velocity. Conversely, having that velocity, if a train be stopped by brakes or any other cause within a distance of say 836 ft., then the efficiency of the retarding forces as a whole has been  $83.61 \div 836 = 1-10$  that of gravity.

The accompanying little table (Table I.) gives these distances through which a body must fall to acquire a given velocity in miles per hour, or through which, conversely, the energy due to a given velocity will lift it. It rests purely and solely upon experiment—experiments first made by Galileo on the leaning tower of Pisa, and many times since repeated—but as the formulae deduced by him and perfected by others are usually for velocities in feet per second, it has been necessary to convert the formula into an equivalent form for velocities in miles per hour. Similar tables for velocities in feet per second will be found in various text books, and in outline in nearly all books which touch upon mechanics at all.

The energy due to the rotation of the wheels and stored up in them as in a fly-wheel in addition to that which they have in common with the rest of the train on account of their forward motion is usually computed separately, when it is computed at all; but for all purposes in connection with the motion of trains for which the one is required to be known, the other may be said to be also, and in Table II. the two are included together. If the wheels were not in contact with the rails, but were mounted like fly-wheels within the car, they would exercise no effect upon the forward motion of the train. After the train had been brought to a stop they would continue to spin around indefinitely until stopped by their own friction; but, being in contact with the rails they act very effectually to carry the train along just so much farther, in the same way as the rotating fly-wheel on the little toy locomotives, which almost every one has seen, causes the latter to move, being in that case the only motive power.

The amount of energy in any rotating body is determined, as may be seen in any pocket-book or treatise on mechanics, by determining the position and velocity of a point called the radius of gyration, which is the radius at which, if the whole mass of the rotating body were concentrated, any given force would communicate the same velocity of rotation as it does to its actual form. Motion in a circular or other curved path at any given linear velocity means the accumulation of the same amount of energy as if the body, as a whole, were moving in a right line at the same velocity.



ity, and if the body be both revolving and moving forward, like the wheels, the two are separate and in addition to each other.

The manner of determining this radius of gyration it is needless to go into in detail. According to the pattern of wheel, it will vary between 0.7 and 0.8 of the actual radius, being in car wheels nearer 0.7 and in locomotive drivers fully 0.8. Assuming a minimum radius of 0.7, it will be plain that points on that circle are rotating with a linear velocity of 0.7 times the velocity of the train, and hence that the *rotative* energy only of the wheels will be 0.7<sup>2</sup> or 0.49—in round numbers *one-half* that due to the forward motion of the wheels in common with the rest of the train. Really it should be a little more than this even figure for ordinary patterns of wheels, and in locomotives it is fully six-tenths.

Estimating ordinary car-wheels to weigh 2½ tons per 8-wheeled car, or 561 lbs. per wheel, the ratio of the weight of the wheels to the total weight will be about—

	In a passenger or loaded freight car. 22½ tons	In an empty freight car. 9 tons	In locomotive and tender.
Weighting.....	10 p. c.	25 p. c.	10 to 12½ p. c.
Per cent. of weight of wheels.....	5 p. c.	12½ p. c.	6 to 7½ p. c.
Making an addition to the total energy of the train of about.....			

We may say, therefore, that the rotative energy of the wheels will add about 6 per cent. as a minimum to the accumulated energy or "*velocity head*" of the train as a whole, in the case of ordinary passenger or loaded freight trains, which with very heavily loaded cars may be a little less; but in the case of long trains, empty cars may be some 4 or 5 per cent. higher. Under this assumption, assuming 6.14 per cent. for ease of computation, Table II. was computed.

We shall now be able, without further consideration of the process of computation, to consider what has been and can be done with brakes under the most favorable and least favorable circumstances, giving a sort of standard of comparison for performances of unknown excellence.

#### The New York Central's Quarterly Report.

The report of the New York Central & Hudson River Company for the quarter ending with March shows that after paying expenses and fixed charges there remained a profit of 52 cents a share, against \$1.22 in the corresponding quarter of last year, which was a very bad year. There was a decrease of 11 per cent. in gross earnings and of 5 per cent. in working expenses, which caused a reduction of \$536,692, or 21½ per cent., in net earnings. Then there was an increase of \$90,000 in fixed charges, so that the amount available for dividends was reduced from \$1,096,698 to \$470,006, or 57 per cent. The figures for this particular quarter in 1883 are not known, but the road then probably earned \$2 per share or more, and the decrease in the stockholders' profits within two years must have been about 75 per cent.

The gross earnings of the road for separate months were reported for three fiscal years ending in 1881, but not in any other years. We compare these gross earnings in those years with those given by the quarterly reports for the last two years as follows:

	3 mos. to Dec. 31.	3 mos. to March 31.	6 mos. to March 31.	Year.
1884-85.....	\$8,810,170	\$5,962,222	\$12,772,390	.....
1881-84.....	7,914,129	6,710,591	14,624,720	\$28,148,667
1880-81.....	8,976,142	7,366,427	16,342,569	32,348,395
1879-80.....	8,540,838	7,765,679	16,316,517	33,175,913
1878-79.....	7,375,769	6,709,509	14,085,277	28,396,563

In every one of these years except 1879-80 the gross earnings were larger in this first half than in the last half of the year, and last year they were 52 per cent. of the year's earnings, at which rate the road will earn \$24,560,000 this year.

For the half-year ending with March the gross earnings were 12½ per cent. less this year than last, and the working expenses 10½ per cent. less; making a decrease of \$891,937, or 15½ per cent., in net earnings. The fixed charges increased \$195,000, and this reduced the profits available for dividends from \$2,934,027 to \$1,847,090—from \$3.28 to \$2.06 per share of stock, a decrease of 37 per cent. In both years the dividends paid exceeded the profits earned in the six months, being \$4 last year and \$2.50 this.

The first quarter of the last fiscal year was favorable, the profits being \$2.06 per share then. The decrease from this to \$1.22 in the second quarter then was not so great as the decrease from \$1.54 to 52 cents this year. But this was due to the greater decrease of expenses then. The decrease in gross and net earnings and working expenses, from the December quarter to the March quarter, were as follows, this year and last:

	Gross earnings.	Expenses. (Inc.)	Net earnings.
1885.....	\$847,948	\$74,130	\$922,078
1884.....	1,203,538	462,906	740,632

This may indicate that the reduction of expenses has gone about as far as it can.

The present condition of things tests the strength

of this company as much as anything seems ever likely to. Under these circumstances the company in the last quarter earned net 31½ per cent. more than its fixed charges. Fortunately for the company these have been kept comparatively light, requiring nearly a third less than was until recently paid in dividends. If it were not for this, the margin over fixed charges would now be uncomfortably narrow. As it is, after having one-third of its net earnings swept away within two years, it still has little left for its stockholders.

Last year, while the profit per share was \$3.28 in the first half, it was only \$1.94 cents in the second half. The conditions are certainly more unfavorable now than they were last year, and unless there is some change in rates, we can hardly expect this half to yield more than at the rate of the last quarter. Last year the profits per quarter were about a fifth less in the last half than in the second quarter, and at that rate there will be a profit of 83 cents per share in the last half of this year, making \$2.89 for the year, and only \$1.85 in the last nine months of it. Therefore, until there is some improvement, it is not probable that there will be any more dividends. Improvement there will be, but there is not now any prospect of it before the end of this fiscal year.

#### The Grand Trunk's Position as to Pools.

At the half-yearly meeting of the Grand Trunk Railway Company in London, April 27, a great deal was said which is of interest to American railroad men, as often happens on such occasions. The great decline in the income of the company causes much dissatisfaction and some opposition to the management among the shareholders, and of this the President of the company, Sir Henry Tyler, was bound to take notice. In fact, his long speech at the meeting was chiefly apologetic. He claimed that the misfortunes of the company were such as the directors could not have avoided by any action of theirs; that so far from resulting from their policy in extending the system, as in purchasing and completing the Chicago & Grand Trunk and leasing the Great Western, these acquisitions have been of the greatest advantage and have saved the company from greater disaster than it has actually encountered, and that after all the Grand Trunk has done better than the other American roads similarly situated.

It is altogether true that nothing which the Grand Trunk management could have done could have prevented a decline in the profits of that railroad. Possibly the losses might have been less if the management had been different in some respects; but the times would have been too much for any management of this road, as they were too much for the management of all other trunk lines. As for the demoralization of through rates, to which a very large part of the losses of the year was due, probably most of the Grand Trunk's competitors think that it was most to blame for the first two-thirds or three-fourths of the year; but probably none would say that it alone was to blame, or that there would not have been a great deal of demoralization whatever the action of the Grand Trunk.

Sir Henry Tyler recites at some length the history of the company's position in the pools. The beginning of the troubles of the year can be traced to the distribution of the Chicago shipments. The Chicago & Grand Trunk was awarded an addition to its percentage on account of the transfer to it of the National Dispatch line from the Michigan Central. By the terms of the agreement, Mr. Fink made a preliminary award, from which, as usual, there was an appeal to arbitrators. The arbitrators reduced the percentage awarded by Mr. Fink, and by the agreement this should have been the end of the matter for the time, the Chicago & Grand Trunk having the right to ask for a new award after a time. But the Chicago & Grand Trunk virtually refused to accept the award of the arbitrators. It demanded that the question should be submitted to a second arbitration. Now there is no doubt that the Grand Trunk believed the arbitration to be very unjust to it, and that some of the best authorities shared this opinion. But its associates in the pool felt that the whole basis of confidence in their agreement was gone if any party to it should refuse to accept a final adjudication of a question in accordance with the terms of the agreement—should claim an appeal from a decision by the Supreme Court because that decision did not suit it. The question of justice or injustice in a special case seemed trifling in comparison with respect for final decisions duly made. Actually the Grand Trunk succeeded in having the case reopened, but the new award was not much more favorable to it than the old one, and there is little doubt that its refusal to abide by the decision at the first arbitration very greatly

weakened faith in the effectiveness of the pool. Though there might have been and probably would have been much cutting of rates in any event, probably the Grand Trunk's profits on the business of 1884 would have been decidedly greater if it had submitted to the first arbitration.

Therefore, when Sir Henry Tyler represents his company as without fault in the conduct which has resulted in the destruction of the profits of through traffic, his statement is not likely to be accepted by the American companies. On the contrary some of them, and perhaps most of them, would probably say that the Grand Trunk for many years, more than any other one company, has prevented the maintenance of rates. This was some years ago a more general opinion than it is now doubtless; and it is quite possible that it has often acted for its best interest in cutting rates.

Sir Henry Tyler announced at the meeting that he would come to this country very soon for the purpose "above all to try and establish equitable and permanent pooling arrangements, which are of the highest importance for us and other railway companies on that continent in the future." There probably has been here a feeling, especially since it gave notice of withdrawal from the Chicago and the trunk-line pools, that the Grand Trunk had lost faith in the value of such arrangements, and deliberately preferred to act independently. But Sir Henry's statement only confirms other recent expressions of Grand Trunk representatives as to its anxiety to join in some arrangement for the restoration and maintenance of rates. The small profits of last year, the continual decrease in the earnings of the company since, and the very bad prospect ahead, would naturally lead managers at all mindful of their shareholders' interests to make all efforts possible to get some profit from the through business, which is the more important to the Grand Trunk because its local business is, for a trunk line with a heavy capital account, light. There is no reason to doubt the sincerity of the Grand Trunk President in this statement of his anxiety to establish "equitable and permanent pooling arrangements." If only his ability were equal to his will, doubtless things would be going on swimmingly by next July; but as nearly all the American railroad managers interested in the business have so far failed in their joint efforts toward this end, we are not wholly confident that Sir Henry Tyler will succeed. If he does, the owners of American railroad shares should erect a statue in his honor as tall as our New York Goddess of Liberty. He can help, however, and his help is indispensable; and it will be encouraging to those who have supposed that the Grand Trunk had permanently abandoned the idea of pooling, that they will have its powerful aid and co-operation in future efforts to secure some profit on through traffic.

The very brief report of the New York, Chicago & St. Louis Railway Company for 1884 is remarkable as showing the lowest average freight rate ever reported, namely, 0.476 cent per ton per mile for all freight. This is but little more than the average *through* rate of the Michigan Central for the same year (0.424 cent). This is explained by the fact that the New York, Chicago & St. Louis has little else than through freight. The expenses were 74½ per cent. of the earnings, which would make the average expenses per ton per mile 0.367 cent. If it is argued that this allows too little for freight and too much for passengers, we reply that the average passenger rate was only 1.68 cents per mile and 75 per cent. of that, or 1.26 cents, seems a very low passenger expense. And, further, the passenger traffic is so insignificant that if we charged the *whole* of the working expenses to the freight, it will make the average cost but 0.395 cent per ton per mile. Is this then an extraordinarily cheap road to work? Not at all. The company has simply been consuming its road and so has saved, for the time, the cost of maintenance. Rails, ties, the long trestle works and the rolling stock were all new; very little needed to be done to them; but the wear of the last two years will all have to be made good and paid for eventually. Unfortunately no details of expenses are reported: they would be interesting.

The average expense is of course lower because most of the traffic is through. The average freight-train-load last year was 242 tons, which is a little less than on the Lake Shore, with its heavy local traffic and great mileage of branches. The passenger traffic was very small, equal to 1½ passenger trains each way daily, with an average load of only 80 each, and earning only 51 cents per train-mile. The freight trains earned \$1.15 per train-mile. The road has not suffered for lack of freight traffic. In proportion to mileage it carried more than the Lake Shore (equivalent to 1,588 tons each way daily, against 1,442 on the



Lake Shore); but it is hard to see how any amount of traffic at last year's rates could have supported it.

What the road is really capable of it is impossible to say until it has been worked long enough to have average renewals made. Owing to the nature of the structure they will probably be costly. But the road has certainly shown itself capable of carrying a large traffic.

Lake navigation opened late this year, the first vessel getting through the Straits of Mackinaw May 8, with great trouble from ice. A single vessel cleared from Milwaukee for the lower lakes that day, and a few on the 4th and 5th from Chicago, but the bulk of the Chicago fleet did not clear till the 6th, when it was reasonably certain that the ice in the straits would not be troublesome. The date of the opening for the last seven years has been:

1879.	1880.	1881.	1882.	1883.	1884.	1885.
Apr. 23.	Apr. 5.	May 4.	Apr. 5.	Apr. 23.	Apr. 24.	May 4.

There has been no later opening of the lakes since 1853 at least.

This makes the season for the lake vessels this year 10 days shorter than last year, 6 shorter than in 1883, and 29 shorter than in 1882.

The Erie Canal was opened last Monday, and the vessels first leaving Chicago hardly had time to transfer cargoes at Buffalo so soon as then. The date of the opening of the canal for seven years has been:

1879.	1880.	1881.	1882.	1883.	1884.	1885.
May 8.	April 20.	May 17.	April 11.	May 7.	May 6.	May 9.

With the great accumulation of wheat at lake ports and the exceptional demand for vessels to take grain from Duluth, both lake vessels and canal boats might expect a more profitable season than usual of late if the railroads were not offering to carry the grain at cost. They have spoiled the transportation business for themselves and for every one else.

The lake rates just before the opening and at which probably most of the vessels were engaged for their first trip down were 3 cents for corn and 4 for wheat from Chicago to Buffalo; but these rates fell off  $\frac{1}{2}$  to  $\frac{1}{4}$  cent by the end of the week. It is interesting to note that at the same time propellers engaged to take wheat from Duluth to Buffalo for 3 cents.

The opening rates on the Erie Canal were  $\frac{1}{4}$  cents a bushel for corn and 5 for wheat from Buffalo to New York. The opening rates on the lakes (Chicago to Buffalo) and the canal (Buffalo to New York) for the last six years have been, in cents per bushel:

Lakes:	1880.	1881.	1882.	1883.	1884.	1885.
Wheat.....	6	5	2 1/4	3 3/4	2 3/4	3 3/4
Corn.....	5	4 1/4	2 1/4	3 1/4	2 1/4	3

It is encouraging to see that the rates are a little higher this year than last, though rail rates were the same, and the higher rates are justified by the very large stocks in Western elevators. Last year within a few days from the opening the rate fell to 2 cents for corn, which was the chief grain shipped then.]

The ocean rate from New York to Liverpool is 2d. per bushel by steam, and the whole cost of transporting a bushel of wheat from Chicago to Liverpool by water is now about 14 cents, including transfers at Buffalo and New York, and only about 14 cents from Duluth to Liverpool, which is less than a rate which has been common, and was esteemed a low charge, from Kansas City, Omaha or Minneapolis to Chicago. Certainly if there is a difficulty in finding a market for our surplus grain, it is not for lack of cheap transportation.

Just before navigation opened contracts were made by propellers to carry wheat from Duluth to Buffalo for 3 cents a bushel, which was but  $\frac{1}{2}$  cent more than the rate from Chicago at the same time. With no greater difference than this, it is difficult to see how paying rates can be got by the railroads for carrying wheat from St. Paul and the country northwest of it to Chicago; and with rates from Lake Superior points so low it would seem possible to send grain east by way of these points not only from northern Minnesota and Dakota, but also from southwestern Minnesota, southern Dakota, western Iowa and Nebraska, to an extent sufficient to fill the cars which go loaded with lumber from Wisconsin, etc., southwestward. From a very large part of the system of the Chicago & Northwestern (including the St. Paul & Omaha), the Chicago, Milwaukee & St. Paul and the Chicago, Rock Island & Pacific (including in the latter the Minneapolis & St. Louis and the Burlington, Cedar Rapids & Northern), the distance to a Lake Superior port is as short as to Chicago or Milwaukee, and as the first two are largely interested in lines to Lake Superior, they will receive the freight on the grain whether it goes to one lake or the other. But they will not welcome a change in the course of traffic which lessens the profits on the traffic carried between St. Paul and Lake Michigan, and low lake rates between

Buffalo and such Lake Superior ports as Duluth, Superior, Washburn and Bayfield will certainly make low rail rates between Chicago and St. Paul, and it is difficult to see what the railroads can do to prevent them. Heretofore the line of equal rates from the sea has not extended far up the Mississippi from St. Louis, but Lake Superior now seems likely to establish northwest of Chicago the very low rates to the seaboard which Lake Michigan has long made necessary southwest of Chicago.

#### April Earnings.

We have reports of April earnings from 26 railroads this week, besides 14 that had reported previously. Of the 26 reporting this week 17 have a decrease in earnings, amounting to \$841,894, and nine a decrease amounting to \$411,052, and the aggregate decrease of the 26 is \$430,842, or 4 1/4 per cent. Included with them is the Canadian Pacific, which has a very large increase in mileage and an increase of \$393,093 (97 per cent.) in earnings. Excluding this, the other 25 roads have an aggregate decrease of \$763,875, or 8 1/2 per cent.—a very serious falling off.

The aggregate result for the 40 railroads that have been reported so far is:

Earnings.....	1885.	1884.	Decrease	P. c.
	\$15,531,535	\$16,511,872	\$980,337	6.0

Of this number 16 had an increase and 24 a decrease in earnings. The 16 which gained had an aggregate increase of \$508,875, nearly two-thirds of which was by the Canadian Pacific, and the only other gains which can properly be called large are 14 per cent. by the Rome, Watertown & Ogdensburg and other gains by small roads which are working a larger mileage than last year. The 24 roads losing had an aggregate decrease of \$1,489,212, of which

The Northern Pacific lost.....	\$568,410
The Central Pacific lost.....	295,079
The St. Paul & Omaha lost.....	103,898
The St. Paul & Manitoba lost.....	97,199

And these four roads lost.....\$1,064,586

So that the other 20 roads lost but \$424,626.

There are, however, several important decreases among the other roads, as a nearer inspection will show, the Central Iowa losing 25 per cent., the West Michigan 18 per cent., the Flint & Pere Marquette 22 per cent., the Mobile & Ohio 24 1/2, the Peoria, Decatur & Evansville 18 1/2, the Alton & Terre Haute Main Line 19 1/2 and its Belleville Line 23 1/2, and the St. Paul & Duluth 22 per cent.

We saw last week that the two great roads northwest of Chicago had nearly the same earnings as last year and the year before. The St. Paul & Omaha, however, which might be expected to share their fate, has a very large loss this year, and for five years its April earnings have been:

1881.	1882.	1883.	1884.	1885.
\$261,211	\$377,288	\$429,330	\$567,998	\$464,100

The mileage has increased rapidly, but is nearly the same this year as last. The decrease is not so discouraging as it appears, from the fact that the earnings were extraordinary last year in April—larger than in any other month of the year except October, while always heretofore earnings have been less in April than in any following month of the year.

The Manitoba shows a large decrease, as the Northern Pacific does, but not nearly so large, and the St. Paul & Duluth also has a large decrease. Of the four roads northwest of St. Paul all but the Canadian Pacific (which is also an eastern road) show a large decrease, though they should have had much more wheat to move this year than last. The St. Paul & Duluth and the Manitoba have made the following returns for five years:

1881.	1882.	1883.	1884.	1885.	
St. Paul & Duluth.....	\$63,068	\$76,705	\$83,360	\$65,193	
Manitoba.....	\$425,985	\$70,890	\$12,017	\$64,909	\$70,830

Thus both roads earned less this year than in 1883. Some other Western roads have had earnings in April as follows:

1881.	1882.	1883.	1884.	1885.	
Can. Pacific.....	\$1,872,370	\$2,051,637	\$2,050,313	\$2,030,070	\$1,735,000
Denver & Rio G.....	43,111	55,230	93,531	473,349	438,169
Chic. & Alton.....	584,190	591,800	600,878	907,231	580,025
Wabash.....	967,033	1,378,194	1,163,651	1,187,141	1,114,488
Peoria, Dec. & Ev.....	51,998	67,084	60,059	62,555	51,016
Alton & T. H.....	139,337	97,605	102,276	104,912	84,335
Belleville Line.....	64,110	67,436	58,976	71,433	54,724
Ind. Bloom. & W.....	206,004	180,477	231,151	168,111	160,892
Ev. & Terre H.....	65,272	55,289	60,470	60,649	60,649
Chic. & W. Mich.....	95,040	129,859	144,528	118,216	118,216
Det. La. & N.....	111,423	134,041	150,702	138,226	115,860
Flint & P. M.....	171,400	188,530	237,517	210,321	168,454
Wis. Central.....	123,705	155,638	121,678	124,536	137,006

The Central Pacific, it is seen, earned less this year than in any other of the five, and the Denver & Rio Grande less than in any other since 1881, when its mileage was much smaller. The Chicago & Alton earned less than in 1883, but more than in previous years. The Wabash has not varied much for the last three years, but earned 19 per cent. less than in 1882. Compared with last year its earnings keep up better than those of most other roads. The Peoria road and both the Terre Haute lines earned less this year than in any other of the five, and the Main Line (which is the Vanderbilt St. Louis line), 37 per cent. less than in 1881.

The Indiana, Bloomington & Western included the 152 miles of the Indianapolis, Decatur & Springfield in 1883 but not in the other years. It earned about the same as last year, but much less than in 1881 and 1882. Of the four lumber roads at the foot of the list, all but the Wisconsin Central have done very badly this year, the Detroit, Lansing & Northern earning less than for three years previous and the Flint & Pere Marquette less than for four years. The decrease of the latter since 1883 is 30 per cent.

The three Southern roads reporting this week have earned as follows in April:

1881.	1882.	1883.	1884.	1885.	
Louisville & Nash.....	\$350,862	\$638,313	\$942,450	\$1,129,291	\$1,179,606
Mobile & Ohio.....	163,550	141,957	129,108	167,700	126,537
Norfolk & West.....	174,438	171,730	100,098	100,001	108,463

The Louisville & Nashville has a small gain over last year,

when it earned 19 per cent. more than ever before in April; the Mobile & Ohio earned less than in any other April; the Norfolk & Western a trifle more than last year and more than ever before.

There has been little so far to indicate what was the course of earnings on the trunk lines and their immediate western connections. Last year they were carrying a great deal of through traffic east without profit; this year a still larger part of their traffic was unprofitable.

The Chicago through shipments last week show very clearly the effect of a generally prevailing 15 cent rate, the shipments having been one-half more than the week before, and this in spite of the fact that it was the first week of lake navigation. This latter, however, probably had no great effect, as the cargoes for the vessels in the harbor were chiefly engaged before the week opened, and few or no vessels arrived during the week. Lake rates fell, however, about half a cent a bushel during the week. The through shipments of flour, grain and provisions last week and the corresponding week in previous years have been:

1880.	1881.	1882.	1883.	1884.	1885.
27,000	22,351	28,273	40,482	53,508	78,500

Thus the shipments were much larger this year than in any other, and were 46 per cent. more than last year, when also navigation was open and the grain rate was 15 cents.

The total shipments and the percentage going by each railroad in each of the last six weeks have been:

Tons:	Apr. 4.	Apr. 11.	Apr. 18.	Apr. 25.	May 2.	May 9.
Flour.....	22,307	22,108	22,681	15,771	17,219	17,041
Grain.....	48,894	54,188	49,850	34,675	27,430	53,360
Provisions.....	5,948	6,793	7,188	6,469	7,139	8,099
Total.....	75,109	83,089	79,719	60,915	51,788	78,500

Per cent.:	Apr. 4.	Apr. 11.	Apr. 18.	Apr. 25.	May 2.	May 9.
C. Grand T.....	19.2	15.6	20.5	5.9	5.1	4.9
Mich. Cen.....	27.4	20.9	15.5	14.6	13.0	25.7
Lake Shore.....	4.6	5.6	4.8	7.0	9.4	17.6
Nickel Plate.....	0.4	0.3	7.8	7.3	0.3	7.2
Ft. Wayne.....	19.8	18.7	25.6	20.5	30.1	21.8
C. St. L. & P.....	12.5	16.8	14.1	18.6	14.5	9.2
Balt. & Ohio.....	5.3	6.6	8.4	8.6	4.4	8.2
Ch. & Atlantic.....	1.8	6.5	3.3	8.5	17.2	5.4
Total.....	100.0	100.0	100.0	100.0	100.0	100.0

Substantially the whole of the increase was in grain, the shipments of which were nearly twice as great as the week before, and among the largest rail shipments ever made, even when navigation was closed and the demand for grain most pressing.

The changes in the percentages are notable, the Michigan Central having twice as large a share as of the smaller shipments of the week before, and carrying three times as large a quantity; while the Chicago & Atlantic and the two Pennsylvania roads had much smaller shares than then. The share of the Lake Shore was also very largely increased, and the three Vanderbilt roads together carried 50.5 per cent. of the whole, against 28.7 the week before, while the Pennsylvania roads carried 31 per cent., against 44.6 the week before.

The Fort Wayne led in flour shipments, taking 36 1/4 per cent. of the whole, while the Michigan Central had 24 1/2 per cent. and the Lake Shore 19 1/2; but in grain the Michigan Central led, with 27 1/2 per cent., the Lake Shore had 18 per cent., and the Fort Wayne 17 1/2 per cent. The Chicago & Atlantic, which had carried 7,873 tons of grain the week before, carried but 3,224 tons last week, though the total grain shipments nearly doubled.

At current rates there is no direct advantage in carrying flour and grain, but there remains a trifling profit on provisions and the higher classes of freight. Until May 1 the roads which carried more than their proportion paid balances to those which were short, but now each road keeps all it receives. It is not probable, however, that they will remain very eager to get a large share of the business at current rates, especially if they have fallen below 15 cents, as is reported this week.

Mr. F. M. Wilder has in use on the New York, Lake Erie & Western Railroad a simple test for stay-bolt iron which has proved very satisfactory, not only because it is so easily and quickly made, but because it has been found to give a more certain indication of the quality of the iron for that particular use than the ordinary tensile or torsional tests made with special testing apparatus.

A piece of the iron to be tested, 2 1/2 to 3 ft. long, is firmly fixed in a vise, horizontally, and a piece of pipe, fitting it loosely, slipped over it to within 6 inches of the edge of the vise, leaving that much of the iron to be tested bare. Two men then walk around with the end of the pipe until the iron has been bent to a right-angle, when it is bent back straight again as nearly as may be. The piece is then turned half round in the vise and the operation repeated, and so on until the specimen breaks, which it generally does all at once, on one edge or the other, about an inch or more from the edge of the vise. No support whatever is afforded to the exposed section of the iron, but the strain is left to concentrate itself wherever it will, and the quality is judged by the number of complete right-angle bends of this kind which the specimen will stand, which is found to vary from four to sixteen in specimens of 1/2 in. iron sold for good stay-bolt iron. In the same lot, however, wider fluctuations than two or three bends are not common, and the present requirement is that in addition to the usual tests stay-bolt iron shall stand twelve bends on an average without fracture.

This test had its origin in the fact that the fractures, coming as they do on the inner edge of the outside fire-box sheet, indicated that they arose from a bending strain concentrating itself at that point. It was at first attempted with success to imitate the effect of these strains by vibrating the upper end of a stay-bolt in a shaper, giving it a throw of 1/2 in. (which was assumed as about the maximum to which



they were exposed in service), the lower end being fixed in the usual way in a piece of boiler iron. It was found that from 2,000 to 9,000 vibrations of this kind sufficed to produce fractures of the same kind and in the same place as in stay-bolts in service. The idea was then conceived of attempting to shorten the test by bending them through a larger angle, and the two methods when compared were found to agree sufficiently well to make the simpler test a very fair one.

An interesting feature in the test is the practical illustration it gives of the effect of overstrain to "strengthen"—i. e., harden—the iron. At each successive bending the force required to bend it increases very noticeably, so that the nearer it is to breaking the harder it is to bend. No better illustration could be desired of the worthlessness of tests for ultimate strength alone as an indication of quality.

A correspondent suggests that an important cause for the fracture of angle-bars on the top edge is that they have been bent downward at the centre, either in manufacture or by previous use on a low joint, so that they "have to be forced into place with a hammer, which produces an undue strain upon the upper edge of the bar at the centre, causing it to break." This he thinks is proven because the fractures always occur on the upper edge.

Without doubting that fracture from this cause may sometimes occur, the theory hardly appears to meet all the facts of the case. Of the large number of such fractures which occur only a few of them can be reasonably supposed to arise from injury at other points or from such defects of manufacture that the angle-bar needs to be hammered into place, as is evident from such records of fractures as appeared in our issues of March 6 and April 3; and there is a reason other than that suggested why the cracks should always come on the upper edge instead of in the base, provided there is ever a tending strain upward, viz., that there is a less area of metal to resist fracture there and that the upper edge is farther from the "neutral axis," or line where bending neither stretches nor compresses the fibres. It is not necessary to assume that the bending strain must be always upward to account for the fractures always being on the upper edge. In fact experiment has long since shown that alternating strains are the most dangerous of all, and will ultimately cause fracture under far less strain than would be required if there were not such alternation. Assuming the breaking strains downward and the breaking strains upward to be of equal frequency and force, it is inevitable that the weakest place will show the first fracture, and the top edge is that weakest place. It would be easy to compute theoretically how much greater the fibre-strains are on the top edge than on the bottom, and hence, by means of the formulae deduced from Wöhler's famous experiments on alternating strains, how great the excess of downward strains would have to be before fracture in the base could occur, but the refinement would be useless, since experience has already shown that in practice fractures do not occur there.

What shall be done with the Central Massachusetts Railroad, is a problem which seems to have hopelessly puzzled the directors and large stockholders of this unsettled corporation. Months have passed since preliminary steps were taken to do something to secure the completion and operation of the road, but nothing substantial has been accomplished. Recently a small number of the stockholders held a meeting, called by some of their number, in Boston, when Mr. H. A. Blood, who has been somewhat prolific in railroad schemes, submitted a plan which he thought would work out the salvation of the corporation. The scheme was plausibly elaborated on paper and in Mr. Blood's remarks, and after some discussion was approved by a majority of those present, and a committee was appointed to submit the bill prepared by Mr. Blood to the Legislature, and to take other measures to secure the success of the plan. It is not necessary to consider this plan or the objections to which it is open. It is a financial fabric with very little solid foundation, and several weak spots, the failure of which will tumble the structure in ruins before it is half built. It is not countenanced by the directors, and apparently by few of the large stockholders, and is therefore not likely to assume an authorized shape. But Mr. Blood has been accorded a hearing by the Committee on Railroads, though it is not very probable that he will accomplish much more, and the problem remains unsolved.

While the Central Massachusetts has thus been waiting for something to turn up, the absorption of the Boston, Barre & Gardner road by the Fitchburg, shows how the Boston & Lowell has missed an opportunity to secure a western connection more direct than through Vermont and Canada, by leasing the Central Massachusetts as far as Jeffersonville and securing the Barre & Gardner road as the Fitchburg has done.

Whether the opportunity was worth embracing, however, is a question admitting of discussion. These very short Boston roads can never make much out of through traffic to and from the West unless they get a large terminal allowance, and as rates have been lately, the less they get the larger their profits—or smaller their losses.

#### Record of New Railroad Construction.

Information of the laying of track on new railroads in the current year is given in the present number of the *Railroad Gazette* as follows:

**Brooklyn Elevated.**—Completed from York and Washington streets in Brooklyn, N. Y., to Broadway and Gates avenue, 5 miles.

**Fort Worth & Denver City.**—Extended northwest to Harrold, Tex., 22 miles.

**Kansas City & Southern.**—Extended southward to Osceola, Mo., 12 miles.

**Minnesota & Northwestern.**—Track laid from Cascade, Minn., northward, 25 miles.

This is a total of 64 miles, making 404 miles thus far reported for the current year. The new track reported to the corresponding date for 14 years past has been:

	Miles.		Miles.
1885.....	404	1878.....	312
1884.....	808	1877.....	365
1883.....	1,396	1876.....	485
1882.....	2,354	1875.....	229
1881.....	1,210	1874.....	423
1880.....	1,510	1873.....	738
1879.....	565	1872.....	1,222

This statement covers main track only, second tracks and sidings not being included.

#### NEW PUBLICATIONS.

**The Materials of Engineering.** By Robert H. Thurston, A. M., C. E., Professor of Engineering, Stevens Institute of Technology, etc. Part II: Iron and Steel. Part III: Non-ferrous Metals and Alloys.

The two closing volumes of this treatise, the first of which (on non-metallic materials) was noticed in our issue of Dec. 19, 1884, are evidently those to which the author has devoted greatest labor and to which he was able to contribute the greatest amount of original material. Each of them is of about twice the thickness of the first volume. It may be said at once that they contain a great deal of valuable material, which now appears for the first time in a general treatise: having previously been accessible only in the less convenient form of separate papers or specifications. Chapters X. and XI. of Part II., for example, on "temperature and time as modifying resistance, flow of metals, fatigue, etc.," and on "specifications, tests and inspections" contain a great deal of materials of this kind, and the information on bronzes is exceedingly full and largely original.

The "materials" treated are dealt with only in their simple elementary forms, the strength of structural shapes, for instance, not being at all discussed, except incidentally in a few special cases. Nearly half of the first volume is given up to descriptions of the various ores and processes of manufacture of iron and steel, and so is of interest to the metallurgist and manufacturer rather than to the engineer as such. A knowledge of these processes is of course desirable, and we may even grant essential, for one who is thoroughly to understand all the properties of metals and the causes thereof, but as it is a subject in itself and of only indirect importance to those who use metals, it would have much reduced the size and cost of the work had it been more closely restricted to its main purpose, the properties of the manufactured article.

A fault which greatly detracts from the value of the work is that sufficient time and care have not been used in arranging and compressing it so that all information of the same kind should be together, due perspective preserved and the time and thought of some hundreds or thousands of readers spared from drawing conclusions and making comparisons which the author ought to make for them. It is literally as well as figuratively a mine of information. To find it one must dig it out for himself.

Yet it should be admitted at once that it is such a mine, and that Professor Thurston has collected together a large part of the valuable information on the subject, in the main of the most recent kind, and a complaint that he has not done more may therefore seem both ungracious and unfair. It is not, however, stated as a complaint, but simply as a fact; and a good proof that it is a fact, chosen quite at random among innumerable others, may be found in paragraph 243 (pages 439-9), on tool steel, which illustrates both the faults and the merits of the book. The three voluminous tables there given contain valuable matter which might well have escaped a less thorough student. Had they been analyzed, averaged, and rearranged according to results, instead of according to the order of laboratory record, they would have no doubt given a close idea of the properties of tool steel and the causes thereof. As it is they are pitchforked in bodily without the slightest attempt even so to arrange them typographically as to facilitate comparison, and they are hence unmeaning and almost worthless without three or four hours' careful work in collecting and comparing—work which the author of a treatise on results should have done himself. Had he done so, he would have boiled down the seven pages into three, preserving every essential or useful fact. That he did not do so imposes great labor on the reader. He is given material to work on which might otherwise be inaccessible, but it is largely raw material, which he must work up himself before he can use it.

In spite of these faults, however, this is a work which every thorough student of the properties of metals will find use for; and as a work of reference for many whose aims are less ambitious it will fill a place which has not heretofore been so well occupied, or indeed occupied at all. The results of Professor Thurston's own investigations are not the least valuable of the material thus referred to, but he shows a catholic readiness to collect information wherever he finds it. Had he but taken as much pains to collate as he has to collect he would have produced a most valuable, or let us rather say more valuable, work.

#### Children on Long Trips.

The confidence people have in the railroad men of the country is aptly shown by the number of small children who are sent through for long distances without any escort. Several cases of this kind have occurred recently, one of them on Sunday last. A little girl, five years of age, from Boston, was being sent through to San Francisco, coming in over the Lackawanna, and going west over the Erie. She had a card pinned on her clothing, stating her destination, and as a result far more attention was paid to her than to any other passenger on the trains. She was taken special care of, the last man in charge turning her over to the one running next west of

him, with particular instructions to take care of her. Last week another little girl, but four years of age, was sent from New York to Denver in the same manner. This fact speaks well for the railroad employees of the country.—*Buffalo Express*.

#### TECHNICAL.

##### The Car Shops.

The Bradley Car Shops in Worcester, Mass., have just completed two handsome reclining-chair cars for the New York, Providence & Boston road. These will be, we believe, the first cars of this kind run on an eastern road, although quite a number are in use on western lines.

The Old Colony Railroad shops in South Boston have just completed a passenger car for the Northern Division. It is 60 feet long and seats 64 passengers. The inside finish is in mahogany.

The Wason Manufacturing Co. at Brightwood (Springfield), Mass., has taken a large contract for cars for the Panama Railroad.

The Pullman Car Shops at Pullman, Ill., are building 12 passenger cars and 250 freight cars for the Chicago, Burlington & Quincy road.

The Michigan Car Co. in Detroit is building 250 freight cars for the Chicago, Burlington & Quincy road, and has other orders on hand.

Wells, French & Co. in Chicago have taken a contract to build 1,000 freight cars for the Chicago, Burlington & Quincy road, that company having let contracts for 1,500 cars in all.

The Litchfield Car & Manufacturing Co. in Litchfield, Ill., has several orders for passenger cars on hand, but is not doing much in the way of freight car work, with the exception of repairs for the Wabash, St. Louis & Pacific road. The shops are now building some mail cars for the Wabash, and passenger cars for the Indiana, Illinois & Iowa, the Burlington, Cedar Rapids & Northern and the Indianapolis & St. Louis.

The Missouri Car & Foundry Co. in St. Louis is building a number of refrigerator cars, and has a good deal of repair work. The foundry is very busy on some large orders for car wheels.

##### Iron Notes.

The plant of the Union Iron & Steel Co., in Chicago, is now being repaired and put in order, and will be ready to start up in a short time.

The Jefferson Iron Works in Steubenville, O., will soon, it is said, pull down their two blast furnaces and build in their place a single large furnace with the latest improvements.

Secaucus Furnace at Secaucus, N. J., has gone out of blast, but will blow in again as soon as some slight repairs are made.

The Blandon Rolling Mill at Blandon, Pa., has stopped running on account of lack of orders.

Franklin Furnace in Sussex County, N. J., will go out of blast shortly to make necessary repairs.

The Manufacturers' Committee, at a meeting held in Pittsburgh this week, decided that it would be impossible, in the present condition of trade, to adopt the schedule of wages presented to the Amalgamated Association.

#### Manufacturing and Business.

On May 1, 1885, the Machine Tool Works, Frederick B. Miles, Engineer, at 24th and Wood streets, Philadelphia, were consolidated with the Industrial Works of William B. Bement & Son, at 21st and Callowhill streets, also of Philadelphia. Mr. James Dougherty, of the Machine Tool Works, has withdrawn his interest, and henceforth the two concerns will be conducted as one under the firm name of Bement, Miles & Co., the members of the firm being William B. Bement, Clarence S. Bement, Frederick B. Miles and William P. Bement. The office will be at 21st and Callowhill streets, Philadelphia. The new firm will continue to build all of the large assortment of machine tools of approved patterns heretofore manufactured by both firms, and the high reputation of both is a guarantee of the continued excellence of their manufacture.

The Woolley Electric Headlight Co. met on May 9, in Indianapolis, and elected the following officers and directors: President, W. W. Douglass; Vice-President, E. M. Johnson; Secretary and Treasurer, William B. Hord; directors, Albert Baker, W. W. Douglass, H. H. McGaughey, L. G. Woolley, E. M. Johnson, W. B. Hord and Thomas Atkinson. A resolution was adopted requesting the directors to make provision for establishing a manufactory in Indianapolis at once, and a committee of three was appointed to select the site and make all the necessary arrangements.

#### The Rail Market.

**Steel Rails.**—Several large orders have been placed, most of them on private terms, although it is understood that about \$26 per ton at mill has been the lowest price. Quotations for small orders range from \$26.50 to \$27.50, for ordinary sections, and \$29 to \$31 for light rails. The market is fairly strong, and manufacturers seem to look for better prices.

**Rail Fastenings.**—There is very little doing, and quotations continue entirely nominal, at 1.90 cents for spikes in Pittsburgh, 2.25 to 2.65 for track-bolts, and \$1.60 to 1.70 for splice-bars. What little business is done is entirely on private terms.

**Old Rails.**—The market for old iron rails is dull, with very few sales reported. Quotations vary from \$17 to \$18 per ton at tidewater. Old steel rails are quoted at \$16.50 to \$17.50 per ton in Pittsburgh, with only a light supply.

#### Western Society of Engineers.

The 208th meeting was held in Chicago, May 5. In the absence of the President Mr. Artington was called to the chair.

The Secretary reported receipt of photograph likeness from Mr. J. J. McVean.

The Secretary read a letter from Col. Prout, Secretary of the Association, to the effect that members could obtain from him any books on the catalogue of John Wiley & Sons at 25 per cent. discount, postage paid; on account of advertising in the *Journal*.

It was voted that a bill from the Association of Engineering Societies for \$1 on each copy of the *Journal* taken by the Society be paid: amount, \$108.

It was voted that the report of the Committee on Topics, adopted at the last meeting, be printed in the *Journal*.

Mr. Wright read a paper, The Best Material for Street Railroad Rails. The Society then adjourned.

#### Engineers' Club of St. Louis.

The club met in St. Louis, April 29, and was called to order by President Moore, 24 members being present.

The Executive Committee reported that the resignation of John A. Sobolewski had been received and accepted. Wm. W. Penney and O. A. Orman were elected members.

Mr. Ockerson's motion to hold the meetings of the club at Washington University was taken up and carried.

Mr. M. L. Holman read a paper, House to House Inspection to Prevent Water Waste. The paper gave a recount of the



inspection made in St. Louis from December, 1883, to March, 1884.

The paper was generally discussed.

Mr. C. F. White read a paper on Dynamometers. The increase in the practice of selling power and the growing need of exact information as to the power required for various classes of work has made a demand for power-measuring machines. Instruments made by leading builders were described and illustrated, including the Kent, the Lawrence, the Emerson, the Ruddick, the Van Winkle and the Wale transmitting dynamometers. Dynamometers are now made so delicate that quantities of work varying from one-tenth to 50 H. P. may be accurately measured, and so conveniently are they arranged that in many cases it is not necessary to disturb a single pulley or a belt.

After a discussion of the paper the meeting adjourned.

#### Car Couplers.

The Pennsylvania Railroad shops at Altoona have completed 150 freight cars for the New York, Philadelphia & Norfolk road. They are intended for fast freight service and are equipped with the Janney coupler and the Westinghouse brake. A correspondent writes: "The 'absence of slack' did not prevent one engine from getting away with a string of 75 of these cars which were sent off last Saturday. The train was a few feet over half a mile long."

#### New Orleans Exposition Awards.

The Kalamazoo Railway Velocipede Co. has received for its exhibit at the New Orleans Exposition two medals of the first class—one for hand cars and the other for velocipede cars. The velocipede car also received a certificate as entitled to special mention. The award was signed by the full committee, and was given to this company in competition with several strong firms.

### General Railroad News.

#### MEETINGS AND ANNOUNCEMENTS.

##### Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

- Atlantic & Pacific*, annual meeting, at the office in Boston, May 21.
- Burlington, Cedar Rapids & Northern*, annual meeting, at the office in Cedar Rapids, Ia., May 26.
- Chicago, Milwaukee & St. Paul*, annual meeting, at the office in Milwaukee, Wis., June 10, at noon.
- Chicago & Northwestern*, annual meeting, at the office in Chicago, June 4. Transfer books close May 2.
- Chicago, St. Paul, Minneapolis & Omaha*, annual meeting, in Hudson, Wis., June 6.
- Missouri, Kansas & Texas*, annual meeting, at the office in Parsons, Kan., May 20, at noon.
- New York & Harlem*, annual meeting, at the Grand Central Depot in New York, May 19, at noon.
- Pittsburgh, Fort Wayne & Chicago*, annual meeting, at the office in Pittsburgh, May 20, at noon.
- St. Louis, Alton & Terre Haute*, annual meeting, at the office in St. Louis, at 2:30 p. m. on June 1.

##### Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

- Boston, Concord & Montreal*, 3 per cent., semi-annual, on the preferred stock, payable May 12, to stockholders of record on May 2.
- Chicago & Alton*, 2 per cent., quarterly, payable June 1, to stockholders of record May 15.
- Cleveland & Pittsburgh* (leased to Pennsylvania Co.), 1½ per cent., quarterly, payable June 1. Transfer books close May 9.
- Iowa Falls & Sioux City* (leased to Illinois Central), 1½ per cent., quarterly, payable June 1, to stockholders of record on May 9.
- Oregon Railway & Navigation Co.*, 1½ per cent., quarterly, payable June 1, to stockholders of record on May 18. This is the regular quarterly dividend, but delayed one month.

#### Railroad and Technical Conventions.

Meetings and conventions of railroad associations and technical societies will be held as follows:

- The *Western Association of General Passenger & Ticket Agents* will hold its half-yearly meeting in Cleveland, O., on Wednesday, May 13.
- The *Master Car-Builders' Association* will hold its annual convention at the Hygeia Hotel, Old Point Comfort (Fortress Monroe), Va., beginning on Tuesday, June 9.
- The *Yardmasters' Mutual Benefit Association* will hold its annual convention in Philadelphia, on Wednesday, June 10.
- The *Master Mechanics' Association* will hold its annual convention in Washington, beginning on Tuesday, June 16.
- The *American Association of Train Dispatchers* will hold its annual convention in Denver, Col., on Tuesday, June 16.
- The *Car Accountants' Association* will hold its annual convention in Minneapolis, Minn., beginning on Tuesday, June 23.
- The *General Baggage Agents' Association* will hold its half-yearly meeting in St. Paul, Minn., on Wednesday, July 15.
- The *National Association of General Passenger & Ticket Agents* will hold its next half-yearly meeting in New York, at 11 a. m., on Tuesday, Sept. 15.
- The *Master Car-Builders' Club* will hold regular meetings at its rooms, No. 113 Liberty street, New York, on the evening of the third Thursday in each month.
- The *New England Railroad Club* will hold its regular meetings at its rooms in the Boston & Albany station, in Boston, on the evening of the fourth Wednesday in each month.
- The *Western Railway Club* will hold regular meetings at its rooms, No. 102 Adams street, Chicago, on the third Wednesday in each month.

#### Foreclosure Sales.

The *Texas Western* road was sold in Houston, Texas, May 5, under a decree of the District Court, to satisfy a judgment. It was bought for \$140,500, by Mr. John Cummins, representing New York creditors. The road is of 3 ft. gauge and extends from Houston, Tex., to Seale, 54 miles. Its capital stock was \$1,000,000, and the issue of bonds at the rate of \$12,000 per mile was authorized, but none have been issued, although some are understood to have been pledged as security for loans.

The *Connotton Valley* road was sold in Canton, O., May 9, under decrees of foreclosure of the mortgages, and was bought for \$635,000 by A. N. Parlin, of Boston, for account of the Reorganization Committee of bondholders. The road extends from Cleveland, O., to Coshocton, 115 miles, with 46 miles of branches. The bondholders have nearly all united in a plan of reorganization, under which the present bonds are to be converted into preferred stock, and the road is to be changed from 3 ft. to standard gauge and extended from Coshocton to Zanesville.

#### Car Accountants' Association.

The tenth annual convention of this Association will be held at Minneapolis, Minn., Tuesday, June 23, 1885, at 9 a. m. The Committee of Arrangements have selected the

West Hotel, and specially low rates have been secured for delegates and their families.

A cordial invitation is extended to all railroads and companies owning cars to send a representative to the meeting, and it is to be hoped that a full attendance of old and new members will be secured.

The Chicago & Northwestern Railway will provide a special train to convey delegates and their families from Chicago to Minneapolis and return, and all desirous of attending will please communicate with Mr. F. M. Luce at as early a date as possible, in order that their transportation may be arranged promptly. Rooms at the hotel can be secured in advance by notifying Mr. Clinton Brooke, Car Accountant, Minneapolis & St. Louis Railway, Minneapolis, Minn.

Delegates intending to be present at the convention will please notify Mr. H. H. Lyon, Secretary (Bloomington, Ill.), at as early a date as practicable.

#### American Institute of Mining Engineers.

A circular from the Secretary announces that the 42d meeting of the Institute will be held in Chattanooga, Tenn., beginning on Tuesday afternoon, May 19. The headquarters will be at the Stanton House, where the rate to members will be from \$2.50 to \$3 per day. Mr. H. S. Chamberlain is Chairman and Mr. M. L. Chapman Secretary of the Local Committee of Arrangements.

The Secretary calls the attention of the members to the low railroad rates now ruling in connection with the New Orleans Exposition. By taking New Orleans excursion tickets with stop-over privileges members will secure reduced rates, even if they do not use the tickets beyond Chattanooga; or they can, without extra expense for railroad fare, visit New Orleans before or after the meeting.

The following programme for the meeting is announced: Tuesday, May 19.—Opening session of the Institute at 8 p. m.

Wednesday, May 20.—Visit to mines and furnaces of the Tennessee Iron & Coal Co. at South Pittsburgh. A business session will be held in the evening.

Thursday, May 21.—Business session at 10 a. m. and 8 p. m. In the afternoon visits to points of interest about the city, and after the evening session an entertainment at the Stanton House.

Friday, May 22.—Excursion to Rockwood, and visit to furnaces and mines of the Roane Iron Co.; also to the furnaces and mines of the Dayton Coal & Iron Co., at Dayton.

Saturday, May 23.—An excursion to Birmingham, Ala., will leave Chattanooga on Friday night or Saturday morning. Particulars to be obtained from the Local Committee on and after the first day of the meeting.

A number of interesting and valuable papers are announced to be read at the meeting.

#### ELECTIONS AND APPOINTMENTS.

*Artesia, Starkville & Grenada*.—Mr. L. D. McDowell, of Starkville, Miss., is President of this new company.

*Ashuelot*.—This company, whose road is leased to the Connecticut River Co., has elected A. B. Harris, President; F. F. Lane, Clerk; E. F. Lane, Treasurer.

*Augusta & Knoxville*.—At the annual meeting in Augusta, Ga., May 6, the following were elected: President, E. A. Verdery; Vice-President, P. H. Bradley; Directors, J. W. Clark, J. J. Cohen, Z. McCord, J. D. Neel, A. M. Aiken, R. H. Middleton, W. G. Raoul, A. Mullarky, J. H. Alexander, W. B. Young, J. C. Maxwell, C. M. Buckhalter, J. F. Reilly, W. C. Sibley, J. W. Green and Moses Wadley.

*Boston & Lowell*.—Mr. G. M. Thompson has been appointed Chief Engineer in place of I. M. Story, resigned. Mr. Thompson was recently on the Mexican Central road.

*Brunswick & Western*.—Mr. A. A. Gaddis, whose election as Vice-President was noted last week, is appointed General Manager also, in place of H. S. Morse, resigned.

*Carolina Central*.—At the annual meeting in Wilmington, N. C., last week, the following directors were chosen: D. W. Oates, Charlotte, N. C.; M. P. Leake, Wadesboro, N. C.; C. Goddard, Wilmington, N. C.; C. H. Roberts, R. S. Tucker, Raleigh, N. C.; Wm. W. Chamberlain, Norfolk, Va.; Severn Eyre, R. C. Hoffman, J. L. Minis, J. M. Robinson, J. S. Whedbee, Baltimore. The new directors are Messrs. Goddard and Roberts, who replace C. M. Stedman and J. C. Winder.

*Central of New Jersey*.—At the annual meeting in Jersey City, May 8, the old directors were re-elected, as follows: Henry S. Little, Freehold, N. J.; Henry C. Kelsey, Newton, N. J.; John Kean, Elizabeth, N. J.; Robert Garrett, Baltimore; Edward C. Knight, George DeB. Keim, Philadelphia; Sidney Shepard, Samuel Sloan, J. Kennedy Tod, New York.

*Champaign, Havana & Western*.—Mr. Anthony J. Thomas is appointed Receiver of this road, late a part of the Wabash system.

*Chartiers*.—This company, whose road is leased to the Pittsburgh, Cincinnati & St. Louis, has elected George B. Roberts, President; Alexander Biddle, J. N. DuBarry, Wm. L. Elkins, N. P. Shortridge, Edmund Smith, directors.

*Cheshire*.—At the annual meeting in Keene, N. H., May 13, the old directors were re-elected. At a meeting of the board William A. Russell was elected President; Edward C. Thayer, Vice-President; R. Stewart, Clerk and General Manager; T. H. Kingsbury, Treasurer.

*Chicago, Burlington & Kansas City*.—Mr. Howard Elliott is appointed Auditor, with office at Keokuk, Iowa.

*Cleveland, Lorain & Wheeling*.—At the annual meeting in Cleveland, O., May 13, the following directors were elected: Selah Chamberlain, Worthy S. Streater, E. R. Perkins, John Hay, Oscar Townsend, Cleveland; John Newell, Chicago; H. A. Kent, New York.

*Cleveland Southern*.—Mr. H. T. Dunham, of Cleveland, O., has been appointed Chief Engineer of this new road.

*Dallas & Northwestern*.—This company has been organized at Dallas, Tex., with officers as follows: President, T. L. Marsalis; directors, J. S. Daugherty, E. M. Powell, A. W. Childress, Frank Cockrell, W. H. Lemon, H. C. Clark, O. P. Bowser, A. J. Porter and Thomas Field.

*Delaware & Hudson Canal Co.*—At the annual meeting in New York, May 12, the following managers were chosen: Robert M. Olyphant, John Jacob Astor, David Dows, A. A. Low, James M. Halsted, Le Grand B. Cannon, John A. Stewart, James R. Taylor, Robert S. Hone, James Roosevelt, Abraham R. Van Nest, Hugh J. Jewett and Benjamin H. Bristow. The only change made in the old board was the substitution of Mr. Stewart for Thomas Cornell, who declined a re-election.

*Delaware, Lackawanna & Western*.—Mr. W. K. Niver, Superintendent of the Syracuse & Binghamton Division, is to be Superintendent of the Oswego & Syracuse Division also, in place of W. B. Phelps, resigned.

*Denver, Aspen & Grand River*.—The directors of this new company are: Walter S. Cheesman, Jerome B. Chaffee, D. M. Moffatt, Denver, Col.; W. L. Scott, Erie, Pa.; Addison Cammack, Adolph Engler, Josiah C. Reiff, New York.

*Deerfield River*.—Mr. D. E. Brady is Engineer in charge of construction on this road and has his office at Reedsboro, Vt.

*Hanover Junction, Hanover & Gettysburg*.—At the annual meeting, held in Hanover, Pa., May 11, the following officers were all re-elected: President, A. W. Eichelberger; directors, Reuben Young, Peter Flickinger, Stephen Keefer, William Grumbine, Robert M. Wirt, Henry A. Young, Matthew Eichelberger, David Wills, Charles W. Sagle, William Buehler.

*Hayward & Southern*.—This new company's office is at Hayward, Wis.; the directors are: F. L. Clark, E. H. Holbert, J. L. Holman, R. L. McCormick, C. E. Rogers.

*Indiana, Bloomington & Western*.—At the annual meeting in Indianapolis, May 12, the old board was re-elected without change.

*Indianapolis, El River & Southeastern*.—This company has elected officers as follows: President, Samuel J. Huntington, Jr., New York; Vice-President, Robert Smith, Poland, Ind.; Secretary, W. K. Eldridge, Indianapolis.

*Lake Shore & Michigan Southern*.—Mr. J. T. R. McKay, the new General Freight Agent, issued the following circular May 5:

"Mr. M. S. Chase is appointed General Agent with office at Chicago, Ill., and will act and perform such duties as may be assigned him by Mr. Charles M. Gray, Assistant General Freight Agent. Mr. John G. James is appointed Assistant General Freight Agent, with office at Cleveland, O., and will, under direction of the General Freight Agent, have charge of the local freight business at all stations except Chicago, Englewood and South Chicago, and of such other freight business as the General Freight Agent may direct. Mr. A. E. Billings, General Agent, with office at Hillsdale, Mich., will act under and perform such duties as may be assigned him by Mr. John G. James, Assistant General Freight Agent. Mr. H. Bromley, General Agent, with office at Jackson, Mich., will, under the direction of the General Freight Agent, have charge of the pine lumber and salt traffic originating on the road or coming from connecting lines at Toledo, Detroit and all stations west thereof, except Chicago, Englewood and South Chicago, and such other business as the General Freight Agent may direct. All other officers connected with this department will perform the duties hitherto assigned them."

*Leadville, South Park & London*.—The office is in Denver, Col.; the directors are John F. Herrick, D. H. Moffatt, E. O. Wolcott, H. R. Wolcott, Samuel N. Wood.

*Little Rock Junction*.—This company has elected officers as follows: President, F. Gordon Dexter; Secretary, Charles F. Shillaber; Treasurer, Joseph Kampman.

*Louisiana & Missouri River*.—In St. Louis, May 6, this company, whose road is leased to the Chicago & Alton, elected the following directors: John J. Mitchell, R. P. Tansey, John Crerar, H. C. Lodge, C. P. Horton, Arthur B. Silsbee, W. H. Bliss.

*Mann Boudoir Car Co.*—Mr. H. A. Callan is appointed Assistant to the President and General Agent in place of Count Zacharoff, resigned. Mr. C. P. Krauth succeeds Mr. Callan as Division Superintendent at Cincinnati.

*Marietta Mineral*.—Mr. R. E. Phillips is now Vice-President and General Manager. Mr. T. D. Dale is Treasurer.

*Meadville & Linesville*.—The resignation of J. B. Peters as General Superintendent has been tendered and accepted, dating from April 1, 1885. The duties of the office have been assumed by G. W. Delamater, President, who will act through the Auditor, T. A. Delamater, to whom all communications should be addressed.

*Michigan Central*.—At the annual meeting in Detroit, Mich., May 7, the following directors were chosen: Henry B. Ledyard, Ashley Pond, Detroit; Wm. L. Scott, Erie, Pa.; Samuel F. Barger, Chauncey M. Depew, Wm. H. Vanderbilt, Wm. K. Vanderbilt, Cornelius Vanderbilt, Edwin D. Worcester, New York. The only new director is Mr. Pond, who succeeds Anson Stager, deceased.

The controlled *Detroit & Bay City* elected directors as follows: Samuel F. Barger, Chauncey M. Depew, Ashley Pond, Cornelius Vanderbilt, Wm. H. Vanderbilt.

*New York, Susquehanna & Western*.—At the annual meeting in Jersey City, May 7, the old directors were re-elected, as follows: Henry Sanford, Charles Siedler, Jersey City, N. J.; Garrett A. Hobart, Paterson, N. J.; John I. Blair, Blairstown, N. J.; Robert K. Dow, Claremont, N. H.; Simon Borg, Henry Marks, Charles Minzesheimer, Aaron Feck, Henry S. Pierce, Frederick A. Potts, Alfred Sully, Stephen V. White, New York. The board re-elected Frederick A. Potts President; Alfred Sully, Vice-President; J. P. Rafferty, Secretary; C. V. Ware, Treasurer.

*Norfolk & Western*.—At the annual meeting in Roanoke, Va., May 6, the following directors were chosen: N. L. Boyce, Boyce, Va.; Richard S. Brock, John C. Bullitt, Clarence F. Clark, E. W. Clark, James I. Doran, Charles Hacker, F. J. Kimball, E. A. Rollins, George F. Tyler, Philadelphia; George C. Clark, R. B. Minturn, New York. This is the old board, except J. B. Whitehead, whose place is left vacant. The board re-elected F. J. Kimball President; Robert W. Smith, Vice-President; A. J. Hempill, Secretary.

Mr. S. B. Haupt has been appointed Superintendent of Motive Power, with office at Roanoke, Va., in place of Charles Blackwell, resigned. Mr. Haupt was formerly on the Pennsylvania Railroad.

*Pennsylvania Railroad Leased Lines*.—The companies named below, whose roads are leased to the Pennsylvania Railroad Co., last week elected officers as given: *East Brandywine & Waynesburg*.—President, John Cornog; directors, Joseph C. Davis, Anos Diller, J. N. DuBarry, John P. Green, B. F. Kinzer, James McClure, Wistar Morris, George B. Roberts, N. P. Shortridge, Edmund Smith, T. M. Storb, Henry D. Welsh. *Lewisburg & Tyrone*.—President, J. N. DuBarry; directors, James P. Coburn, Wistar Morris, George B. Roberts, Eli Slifer, Edmund Smith, S. C. Stewart. *Pomeroy & Newark*.—Directors, J. N. DuBarry, Wistar Morris, N. P. Shortridge, Edmund Smith, Henry D. Welsh, John P. Wetherill, W. H. Wilson. *Sunbury, Hazleton & Wilkes-Barre*.—President, J. N. DuBarry; directors, D. B. Cummins, Wistar Morris, George B. Roberts, Edmund Smith, Henry D. Welsh, J. Price Wetherill. *Sunbury & Levisstown*.—President, Aaron Fries; directors, James H. Campbell, Stephen Greene, John Hart, S. G. Lewis, John W. Moffly, George Shannon. *Tyrone & Clearfield*.—President, J. N. DuBarry; directors, John P. Green, Wistar Morris, George B. Roberts, N. P. Shortridge, Edmund Smith, Henry D. Welsh.

In Philadelphia, May 10, the following additional election



was held: *Philadelphia, Germantown & Phoenixville*.—President, Edmund Smith; directors, D. B. Cummins, J. N. DuBarry, John P. Green, H. H. Houston, Wistar Morris, George B. Roberts, N. P. Shortridge, John C. Sims, Jr., Henry D. Welsh, J. Price Wetherill.

*Pittsboro*.—The office of this new company is at Pittsboro, Chatham County, N. C.; the officers are: President, H. A. London; Directors, J. A. Alston, L. J. Haughton, R. R. Ihrie, W. L. London, R. J. Powell, G. W. Thompson; Secretary and Treasurer, A. J. Bynum.

*St. Louis, Keokuk & Northwestern*.—Mr. Howard Elliott has been appointed Auditor, with office in Keokuk, Iowa.

*St. Louis & San Francisco*.—At the annual meeting in St. Louis, May 13, the stockholders elected the following board of directors: Edward F. Winslow, Jesse Seligman, Leland Stanford, William F. Buckley, Jay Gould, Walter L. Frost, Horace Porter, C. P. Huntington, Bryce Gray, Russell Sage, A. S. Hatch, Charles W. Rogers, & R. S. Hayes.

*St. Paul, Minneapolis & Manitoba*.—Mr. C. H. Cannon has been appointed Car Accountant for this company, vice H. V. Dougan, assigned to other duties.

*Santa Fe & St. Johns River*.—The office is at Lake Butler, Fla.; the officers are, G. M. Whetstone, President; E. G. Hill, Vice-President; J. L. Davis, Secretary; W. O. Tison, Treasurer; W. H. Edwards, Superintendent.

*Seaboard & Roanoke*.—Mr. L. T. Myers has been appointed Superintendent, with office in Portsmouth, Va., in place of E. G. Ghio, deceased.

*Shamokin Valley & Pottsville*.—This company, whose road is leased to the Northern Central Co., has elected George B. Roberts President; A. J. Cassatt, J. N. DuBarry, John P. Green, Wistar Morris, N. P. Shortridge, Edmund Smith, directors.

*Sheffield & Birmingham*.—At a recent meeting in Sheffield, Ala., officers were elected as follows: W. S. Gordon, President; A. J. Moses, Vice-President and Manager; J. F. Burke, Secretary; J. L. Chambers, Treasurer. The directors are Samuel Thomas, W. L. Chambers, Enoch Easley, H. H. Thompkins, R. G. Hervey, C. A. Collier, M. L. Moses, David Clouton, A. H. Moses, W. S. Gordon, D. M. Bain, J. F. Burke and O. O. Nelson.

*Shenandoah Valley*.—At the annual meeting in Roanoke, Va., May 6, the following directors were chosen: J. W. Maury, Richmond, Va.; U. L. Boyce, Boyce, Va.; W. Milnes, Jr., Milnes, Va.; John T. Lovell, Front Royal, Va.; A. R. Boteler, Shepherdstown, Va.; H. B. Davenport, W. H. Travers, Charlottesville, Va.; Clarence H. Clark, E. W. Clark, Charles Hacker, F. J. Kimball, E. A. Rollins, George F. Tyler, Philadelphia; Sidney F. Tyler, Boston. The only new director is Mr. Maury, who replaces E. T. Steel.

*Sinnemahoning Valley*.—This company has been organized by the election of the following directors: L. L. Craven, D. Burlingame, L. Taggart, Emporium, Pa.; M. M. Griffin, N. M. Metcalfe, Liberty, Pa.; Frank H. Goodyear, Buffalo, N. Y. The board elected Frank H. Goodyear, President; L. Taggart, Vice-President and Secretary; E. O. Cheney, Treasurer.

*Southern Pennsylvania*.—This company, whose road is leased to the Cumberland Valley Co., has elected Thomas Kennedy, President; J. N. DuBarry, John P. Green, Wistar Morris, George B. Roberts, John Stewart, Henry D. Welsh, directors.

*Toledo, Cincinnati & St. Louis*.—At the annual meeting in Toledo, May 12, the following directors were chosen: Wm. R. Patton, Charleston, Ill.; F. J. Blakely, Frank W. Bainbridge, James E. Condon, Toledo, O.; W. E. Hackdon, James Irvine, Lima, O.; Irving A. Evans, Boston; E. R. Chapman, B. H. Van Auken, New York. The board elected E. R. Chapman, President; Wm. S. Bliss, Secretary and Treasurer.

*Versailles & Midway*.—This company's office is at Versailles, Ky. Mr. W. H. Grady is President; Thomas H. Hayes, Vice-President and General Manager.

*Vicksburg, Shreveport & Pacific*.—Mr. M. S. Belknap has been appointed Superintendent in place of F. Y. Dabney, resigned. Mr. Belknap is also Superintendent of the Vicksburg & Meridian road.

*Virginia Midland*.—The following circular was recently issued from the office of Superintendent and Engineer Robert Andrews:

"The following appointments took effect April 15: Mr. H. M. Smith, Master of the Machinery and Car Departments, vice J. E. Wadley, resigned; office, Alexandria, Va. Mr. J. A. Perry, Roadmaster of the entire line, vice P. R. Evans, resigned; office, Charlottesville, Va. Mr. F. J. Cabell, Assistant Engineer, will have charge of the construction and repairs of bridges, buildings, water-works and other structures, together with the details of engineering; office, Alexandria, Va."

Mr. F. B. Waddy is continued as Chief Clerk of the Machinery and Car Departments.

*Ware River*.—This company, whose road is leased to the Boston & Albany, has elected directors as follows: H. B. Chapin, E. B. Gillett, C. A. Perley, J. A. Rumrill, C. A. Stevens, C. E. Stevens, W. W. Whitney.

*York & Peachbottom*.—At the annual meeting, May 4, the following were elected: President, Charles R. McConkey; directors, George S. Billmeyer, John Humphrey, Henry Keiser, Michael Schall, John H. Small, Edward G. Smyser.

## PERSONAL.

—Mr. I. M. Story has resigned his position as Chief Engineer of the Boston & Lowell Railroad.

—Mr. W. B. Phelps has resigned his position as Superintendent of the Oswego & Syracuse Division of the Delaware, Lackawanna & Western road.

—Mr. Max E. Schmidt is now at Tampico, Mexico, in charge of construction on the Tampico-San Luis Potosi Division of the Mexican Central road.

—Col. F. Y. Dabney has resigned his position as Superintendent and Chief Engineer of the Vicksburg, Shreveport & Pacific road on account of ill health.

—It is reported that Messrs. Horace Russell and Theodore Houston have asked to be relieved from their positions as Receivers of the New York, West Shore & Buffalo road.

—Hon. George V. N. Lathrop, just appointed Minister to Russia in place of Gen. Lawton, declined, is a prominent Michigan lawyer, and was attorney for the Michigan Central Railroad Co. for a number of years.

—Mr. Archer Baker has resigned his position as General Superintendent of the Eastern Division of the Canadian Pacific road. Mr. Baker has served some 15 years on Canadian lines, and now retires on account of ill health.

—Mr. J. E. Wadley has resigned his position as Master Mechanic of the Virginia Midland road. His address for the present is at Alexandria, Va. Mr. Wadley has been connected with the road for 29 years, in various capacities.

—Mr. R. C. Vilas has resigned his position as Freight Traffic Manager of the New York, Lake Erie & Western road. He has been with the Erie for 12 years, having been General Freight Agent 10 years, and Freight Traffic Manager for two years past.

—Mr. B. L. Harding has resigned his position as Vice-President and General Manager of the Wisconsin, Iowa & Nebraska road. Mr. Harding built a large part of the road as contractor, and at one time owned a large part of the stock. It is understood that he has sold out at least a part of his interest.

—Mr. John W. Nystrom, a well-known mechanical engineer, died in Philadelphia, May 9, aged 62 years. Mr. Nystrom was a Swede by birth, but resided in this country for a number of years, and was well known as an expert in steam engineering, which was his special study. He was a member of the Franklin Institute, and frequently delivered lectures before that body.

—Mr. Henry S. Morse, for two years past General Manager of the Brunswick & Western road, has resigned that position. Mr. Morse has had much experience with railroad work, having served as a Division Superintendent on the Delaware & Hudson Canal Co.'s line, the Baltimore & Ohio, and on the Texas & Pacific, and as General Superintendent on the Indianapolis, Decatur & Springfield before going to the Brunswick & Western.

—Mr. James S. Morrison has resigned his position as Chief Engineer of the Cape Fear & Yadkin Valley road. Mr. Morrison has been Chief Engineer of the line for a long time, and was for some time General Superintendent also. He was relieved from the duties of the last-named position a short time ago in order that he might his whole time to supervising the extension of the road.

—Mr. Paul Bremond, for many years a prominent citizen of Houston, Tex., died suddenly in Galveston, May 8, while on a visit to a friend in that city. Mr. Bremond was 74 years old, and came to Texas when still a young man. He located at Houston, where for many years he was a successful merchant and afterwards banker. He was the first projector of the line now known as the Houston & Texas Central, and was for a long time President of the company, contributing very largely from his own hands towards the building of the road. After his retirement from the presidency, he remained for several years a director and took an active part in the management. After finally withdrawing from that company he commenced the construction of the Houston, East & West Texas, which was built largely with money furnished by him, and in which he held nearly all the stock. He has pushed the road forward gradually, and under arrangements now made it will soon be in operation from Houston to Shreveport. Mr. Bremond was very active for a man of his age, and his death was quite unexpected, coming after only two days' illness. He leaves a widow and six children, all grown up. His fortune is estimated at over \$2,000,000.

## TRAFFIC AND EARNINGS.

### Coal.

Anthracite coal tonnages, as given by the weekly reports of the companies, have been as below for eight years past in the four months to May 2:

	1885.	1884.	Inc. or Dec.	P. c.
1885.....	7,594,863	1881.....	7,853,940	
1884.....	8,616,715	1880.....	6,753,492	
1883.....	9,188,323	1879.....	7,021,164	
1882.....	7,085,509	1878.....	4,100,651	

The decrease from last year is 1,021,852 tons, or 13.5 per cent. The tonnage so far reported this year is the smallest since 1880.

Bituminous tonnages reported for the four months ending May 2 are as follows:

	1885.	1884.	Inc. or Dec.	P. c.
Cumberland, all lines.....	807,698	762,412	45,286	5.9
Huntingdon & Broad Top.....	58,665	65,869	7,204	10.9
Barclay B. R. & Coal Co.....	87,928	118,813	30,885	35.0
Pennsylvania R. R.....	1,054,540	984,081	70,459	7.2
Penn and Westmoreland.....	270,546	370,572	100,026	27.0
Minor districts.....	518,650	523,945	5,295	1.0
Total.....	2,798,027	2,825,692	27,665	1.0

Here the only gains are in the Cumberland and Clearfield districts. The losses have been small elsewhere, however, except where the production has been stopped by strikes.

Coke tonnages reported for the four months to May 2 are:

	1885.	1884.	Inc. or Dec.	P. c.
Southwest Penn. R. R.....	947,786	747,115	200,671	26.8
Other districts, Penn. R. R.....	186,677	170,737	15,940	9.3
Connellsville, via Penn. R. R.....	27,334	113,213	85,879	76.0
Total.....	861,797	1,031,065	169,268	16.4

The decrease in coke tonnage continues, and seems likely to be kept up for some time yet.

Actual tonnage passing over the Pennsylvania & New York road for the five months of its fiscal year from Dec. 1 to May 2 was:

	1885.	1884.	Decrease.	P. c.
Anthracite.....	421,482	493,363	71,881	14.6
Bituminous.....	106,217	148,680	42,463	28.5
Total.....	527,699	642,043	114,344	17.8

The anthracite comes chiefly from the Lehigh Valley road, of which this line is an extension.

The coal tonnage of the Pennsylvania Railroad for the week ending May 9 was:

	Coal.	Coke.	Total.	1884.
Line of road.....	144,687	47,165	191,852	197,573
From other lines.....	69,615	820	70,435	71,329

Total..... 214,302 47,985 262,287 268,902  
Year to May 9..... 3,686,705 882,725 4,569,430 4,598,393  
Decrease for the week, 6,915 tons, or 2.6 per cent.; for the year, 28,993 tons, or 0.6 per cent.

Cumberland coal shipments for the week ending May 9 were 64,482 tons. The total to May 9 this year was 872,181; last year, 822,978; increase, 49,203 tons, or 6 per cent.

### Chicago-Ohio River Pool.

At a meeting of the managers of roads in the Ohio River pool in Chicago, May 8, it was decided to continue the existing rates and to make weekly statements of business done similar to those made by the east-bound trunk-line pool.

### New York State Canals.

Navigation on the Erie Canal opened May 11, according to the notice previously given. The opening clearances from Buffalo are reported light, but few boats being ready to start. Thus far the canal business is not as large as usual for the opening week.

## Railroad Earnings.

Earnings of railroad lines for various periods are reported as follows:

Four months ending April 30:					
	1885.	1884.	Inc. or Dec.	P. c.	
Canadian Pacific.....	\$1,990,237	\$1,122,826	I.	\$867,411	76.9
Central Iowa.....	391,097	447,204	D.	56,107	12.5
Central Pacific.....	6,210,375	6,355,119	D.	144,744	2.3
Chi. & Alton.....	2,454,848	2,645,136	D.	90,278	3.5
Chi., St. P., M. & O.....	1,554,025	1,713,686	D.	159,661	9.3
Chi. & W. Mich.....	371,480	497,805	D.	126,325	25.3
Cin., W. & Balt.....	609,497	575,960	I.	33,537	5.8
Cleve., Ak. & Col.....	143,463	141,061	I.	2,402	1.7
Denver & R. G.....	1,736,994	1,602,963	I.	134,031	8.4
Ev. & T. Haute.....	222,402	221,980	I.	422	0.2
Flint & Pere M.....	600,512	813,107	D.	212,595	26.0
Ind., Bloom. & W.....	762,830	790,519	I.	32,311	4.4
Kansas City, Ft. Scott & Gulf.....	848,629	765,749	I.	82,880	10.8
Kan. City, Spr. & Mem.....	591,903	296,490	I.	295,413	99.6
Louis. & Nash.....	4,693,178	4,307,777	I.	385,401	7.4
Marq., H. & Ont.....	84,330	88,009	D.	3,679	5.8
Mexican Central.....	1,287,879	858,148	I.	409,731	47.7
Mil. L. S. & W.....	373,268	349,322	I.	23,946	6.9
Mobile & Ohio.....	683,608	693,576	D.	9,968	1.4
Norfolk & West.....	844,420	844,678	D.	258	0.0
Ohio Southern.....	143,054	149,102	D.	6,038	4.3
Peoria, Dec. & E.....	227,010	254,241	D.	27,231	10.7
St. L., A. & T. H.: Main Line.....	383,371	476,641	D.	93,270	24.3
Bellefonte Line.....	252,203	278,063	D.	25,860	9.3
St. L., Ft. Scott & Wichita.....	169,098	156,142	I.	12,956	8.3
St. P. & Duluth.....	277,391	282,217	D.	4,826	1.7
St. P., M. & Man.....	2,141,550	2,361,534	D.	219,984	9.3
Tol., Ann Arbor & N. M.....	85,763	64,861	I.	20,902	32.2
Wab., St. L. & P.....	4,887,549	5,072,504	D.	184,955	3.6
Wis. Central.....	470,444	483,207	D.	12,763	2.6
Three months ending March 31:					
Bur., C. R. & No.....	\$98,625	\$633,176	I.	\$534,551	10.3
Net earnings.....	170,407	170,826	D.	3,779	2.1
Canadian Pac.....	1,313,237	778,839	I.	534,378	68.6
Net earnings.....	279,490	860,235	D.	580,745	20.9
Ches. & Ohio.....	779,779	230,022	D.	549,748	22.7
Net earnings.....	177,813	301,229	I.	123,416	18.3
Ches., O. & S. W.....	356,232	35,981	I.	320,251	158.4
Net earnings.....	93,018	79,270	I.	13,748	8.2
Des M. & Ft. D.....	85,753	22,086	D.	63,667	1.1
Net earnings.....	21,840	150,856	I.	129,016	4.5
Elliz., Lex. & B. S.....	157,630	25,458	I.	132,172	47.8
Net earnings.....	37,056	169,907	I.	132,851	9.6
Kentucky Cent.....	186,149	38,913	D.	147,236	0.9
Net earnings.....	38,962	557,131	I.	518,169	5.9
Mobile & Ohio.....	557,131	525,786	I.	31,345	5.9
Net earnings.....	143,892	145,927	D.	2,035	1.4
N. Y. Central & Hudson River.....	5,962,222	6,710,591	D.	748,369	11.2
Net earnings.....	1,955,007	2,491,698	D.	536,691	21.5
Month of March:					
Bur., C. R. & No.....	\$272,349	\$217,349	I.	\$55,000	25.4
Net earnings.....	83,683	64,997	I.	18,686	28.7
Canadian Pac.....	488,896	279,575	I.	209,321	74.8
Net earnings.....	128,271	313,542	D.	185,271	10.7
Ches. & Ohio.....	468,775	97,369	D.	371,406	14.3
Net earnings.....	63,419	216,110	I.	152,691	34.0
Ches., O. & S. W.....	128,528	19,526	I.	109,002	10.7
Net earnings.....	38,054	15,582	I.	22,632	95.0
Des M. & Ft. D.....	32,817	25,580	I.	7,237	24.0
Net earnings.....	10,655	5,956	I.	4,699	78.3
Elliz., Lex. & B. S.....	53,307	57,519	D.	4,212	7.3
Net earnings.....	9,519	13,658	D.	4,139	32.2
Kentucky Cent.....	81,571	65,377	I.	16,194	9.5
Net earnings.....	20,464	21,659	D.	1,195	5.5
Mobile & Ohio.....	190,956	185,275	I.	5,681	3.1
Net earnings.....	54,876	57,536	D.	2,660	4.6
Month of April:					
Canadian Pac.....	\$677,000	\$343,967	I.	\$333,033	97.0
Central Iowa.....	92,221	122,908	D.	30,687	25.0
Central Pacific.....	1,735,000	2,030,079	D.	295,079	14.5
Chicago & Alton.....	590,025	607,281	D.	17,256	2.8
Chi., St. P., Min. & Omaha.....	464,100	567,098	D.	103,858	18.3
Chi. & W. Mich.....	118,216	144,568	D.	26,352	18.2
Cin., W. & Balt.....	135,171	141,008	D.	5,837	4.1
Cleve., Ak. & C.....	39,631	40,533	D.	902	2.2
Denver & R. G.....	438,160	473,349	D.	35,189	7.4
Ev. & T. Haute.....	60,649	60,470	I.	179	0.3
Flint & Pere M.....	168,454	216,321	D.	47,867	22.1
Ind., Bloom. & W.....	169,892	168,111	I.	1,781	1.1
Kan. C., Ft. S. & Gulf.....	187,070	183,241	I.	3,829	2.1
Kan. City, Spr. & Mem.....	130,426	96,217	I.	34,209	35.6
Louis. & Nash.....	1,157,605	1,123,291	I.	32,314	2.9
Marq., H. & O.....	23,972	24,204	D.	232	1.0
Manhattan.....	594,602	.....	.....	.....	.....
Net earnings.....	286,028	.....	.....	.....	.....
Mexican Central.....	360,200	244,110	I.	62,090	25.4
Mil. L. S. & W.....	104,853	97,383	I.	7,470	7.7
Mobile & Ohio.....	126,537	167,790	D.	41,253	24.5
Norfolk & West.....	198,468	196,001	I.	2,467	1.3
Ohio Southern.....	38,809	39,599	D.	790	2.0
Peoria, Dec. & E.....	51,016	62,555	D.	11,539	18.4
St. L., A. & T. H.: Main Line.....	84,385	104,912	D.	20,517	19.5
Bellefonte Line.....	54,724	71,433	D.	16,709	23.5
St. L., Ft. Scott & Wichita.....	49,379	33,804	I.	15,575	45.8
St. P. & Duluth.....	63,193	83,360	D.	15,167	21.9
St. P., M. & Man.....	707,800	804,999	D.	97,199	12.1
Tol., Ann Arbor & N. M.....	20,563	17,400	I.	3,163	21.8
Wab., St. L. & P.....	1,114,488	1,187,141	D.	72,653	6.1
Wisconsin Central.....	137,600	122,536	I.	15,070	12.2
First week in May:					
Canadian Pac.....	\$120,000	\$94,000	I.	\$26,000	27.7
Chi. & Alton.....	135,836	148,328	D.	12,492	8.4
Chi. & East. Ill.....	30,001	29,620	I.	381	1.9
Chi., Mil. & St. P.....	429,000	418,046	I.	10,954	2.6
Chi. & Norwest.....	435,200	412,300	I.	22,900	5.5
Illinois Central.....	173,300	163,780	I.	9,540	5.8
Iowa lines.....	20,000	27,056	D.	7,056	38.9
Long Island.....	59,750	58,577	I.	1,173	2.0
Delaware & N. D.....	29,750	23,000	D.	6,750	22.8
Mil. & Northern.....	10,260	10,097	I.	163	1.6
Rock. & Pitta.....	18,974	19,138	D.	164	0.9
St. L. & San F.....	72,000	77,700	D.	5,700	7.9



thought there will be no further trouble. Later dispatches say that the situation has been complicated by a demand of the Missouri Pacific for a share in the Omaha business.

#### Cotton.

Cotton movement for the week ending May 8 is reported as follows, in bales:

Interior markets:	1885.	1884.	Inc. or Dec.	P. c.
Receipts.....	8,552	11,540	D. 2,688	24.0
Shipments.....	14,957	13,814	I. 1,143	8.1
Stock, May 8.....	81,923	81,235	I. 688	0.8
Seaports:				
Receipts.....	8,633	15,657	D. 7,024	45.6
Exports.....	40,230	18,261	I. 21,969	120.3
Stock, May 8.....	520,280	531,249	D. 10,969	2.1

The total movement from plantations for the cotton year (from Sept. 1) to May 8 is estimated at 5,559,981 bales; a decrease of 11,800 bales as compared with last year, and of 1,157,583 bales from 1882-83, but an increase of 353,100 bales over 1881-82.

#### New York Milk Rates.

After a second hearing of the complaints made against the Long Island Railroad, the New York Railroad Commissioners have repeated their former recommendation that the rates on milk from various points on that road be reduced from 30 to 25c. per 40 quart cans. This decision is based on the conclusion of the board, after a comparison with rates on other freight and with milk rates on other lines, that the present rate is too high.

#### Live Stock Rates.

In Chicago, May 8, notice was received of a reduction of rates on east-bound live stock to a basis of 30 cents per 100 lbs. from Chicago to New York for cattle and 40 cents for sheep. This carries with it a reduction of rates on dressed beef.

#### Central Traffic Association.

A dispatch from Chicago, May 13, says: "Another unsuccessful effort was made to-day to settle the existing complications in east-bound freights. The managers of the roads between the trunk lines' termini and the Mississippi River met and talked for hours. The trunk lines submitted their ultimatum, stating that they had no objection to a Central Traffic Association, but would insist on the agreement being submitted to them for revision and correction. This demand was submitted to a committee, which, after much discussion, decided to postpone action until the Chicago roads settle their own difficulties."

#### Pacific Coast Association.

At the meeting of this Association in Chicago, May 7, the application of the Sunset route for admission to the pool was favorably acted upon. The agreement provides that the agents of the different lines shall form themselves into a committee agreeing upon rates from time to time. All differences are to be settled by arbitration. George M. Bogue, of Chicago, and D. S. Gray, of Columbus, were appointed to agree upon the percentages from May 1. If these two cannot agree, a third arbitrator is to be named. It is expected that this will result in the restoration of Pacific Coast rates.

#### OLD AND NEW ROADS.

**Anderson, Lebanon & St. Louis.**—The purchasers of this road at the recent foreclosure sale have made arrangements to supply the road with equipments in place of that heretofore leased. They will also, as soon as the sale is confirmed and the new company organized, extend the road to Westfield, 6 miles, the object of this extension being to connect with the Louisville, New Albany & Chicago road.

**Artesia, Starkville & Grenada.**—This company has been organized at Starkville, Miss., for the purpose of building a railroad from that place westward to Grenada, the terminus of the Mississippi & Tennessee road. The distance is about 65 miles.

**Baltimore & Ohio.**—This company is buying up property wherever possible along the line of its proposed entrance into the city of Philadelphia, without waiting for the consent of the City Council to its crossing or otherwise using the streets.

The company's application to the City Council for leave to use such streets was brought up in the Philadelphia City Council May 7, and in the lower branch a resolution was passed instructing the City Solicitor to prevent any work being done until councils had acted upon the application. In the upper branch this resolution was referred to a committee, which will not report until the next meeting.

A report comes from Tennessee that this company means to extend its Valley Branch southward into East Tennessee, to Knoxville or Chattanooga, and that its agents are already making a reconnaissance of the ground and are working up local aid.

**Boston, Hoosac Tunnel & Western.**—This company's statement for the quarter ending March 31 is as follows:

	1885.	1884.	Increase.	P. c.
Earnings.....	\$104,225	\$94,477	\$9,748	10.3
Expenses.....	120,070	102,105	17,965	17.6
Deficit.....	\$15,845	\$7,628	\$8,217	107.7
Interest, etc.....	29,200	3,000	26,200	873.3
Total deficit.....	\$45,045	\$10,628	\$34,417	324.7

This road still continues to earn less than its working expenses, although its business has increased largely.

**Brooklyn Elevated.**—This road was formally opened for traffic May 13, when a large number of guests were carried over the line, and after the excursion trains had passed, free passage was given to the public for the rest of the day. The road is on the pattern of the New York elevated lines, and extends from a point near the Bridge terminus to Broadway and Gates avenue, a distance of 5 miles. It was begun several years ago, but the work has been much delayed by litigation.

**Burlington, Cedar Rapids & Northern.**—A dispatch from Des Moines, Ia., May 12, says: "In the United States Circuit Court to-day in the case of Simmons against the Burlington, Cedar Rapids & Northern Railroad Co., involving the validity of over \$4,000,000 in second-mortgage bonds, the road having been formerly sold under a first mortgage, the Court, in a long opinion delivered by Judge Brewer, held the second-mortgage bonds to be good. The decree holds that the plaintiff is entitled to a foreclosure of his mortgage, and to recover the amount of actual indebtedness represented by that part of the bonds held as collateral. The defendants are given the right to redeem the road from the second-mortgage bondholders by paying the amount found to be due. This amount is to be determined by a Master in Chancery. The amount of cash which will pass as the result of this decision will be over \$1,000,000."

**Camden, Gloucester & Mount Ephraim.**—Arrangements are in progress to change this road from 3 ft. to standard gauge. It extends from Camden, N. J., to Mount Eph-

raim, 7 miles. The line is now controlled by the Philadelphia & Reading road, and is operated as a branch of the Philadelphia & Atlantic City.

**Canadian Pacific.**—Dispatches from Toronto state that the gap in this road north of Lake Superior has been filled up by the laying of track, and that there is now a continuous track from Montreal to Jackfish Bay. There remains only a gap of 13 miles west of Jackfish Bay to complete continuous track from Montreal to Winnipeg, and thence to the present end of the track in the Rocky Mountains.

The new proposition for government relief and for a new issue of bonds by this company, is now before the Canadian Parliament, having been introduced by the government, and calls out a long and sharp debate.

**Central, of New Jersey.**—At the annual meeting in Jersey City, May 8, the old board was re-elected, receiving the vote of about 90,000 shares. The opposition vote was not generally polled, the parties holding proxies seeing that it was no use.

The meeting was largely attended, and after the routine business had been transacted a resolution was offered in favor of allowing present relations of the company with the Philadelphia & Reading to continue, provided the Reading Co. give security for the future payment of the amount already due under the lease. This resolution was supported by President Little and others, who feared that any other course would involve the company in a long and extensive litigation. After a discussion, however, in which the Reading management was pretty sharply handled, the resolution was rejected and another resolution adopted instructing the directors to take possession of and manage the Central Railroad property until such time as the Reading Co. is in a position to pay interest on the bonds and dividends on its stock, as agreed under the lease.

It is stated that the board of directors will at once take the necessary steps to comply with this resolution and to recover possession of the road.

The Treasurer is now paying the coupons which were due May 1 on the adjustment bonds but were not then paid.

**Champaign, Havana & Western.**—This road, which has been for some time past known as the Havana Branch of the Wabash, St. Louis & Pacific, is now operated by its own Receiver, pending further action on the part of the bondholders.

**Chicago, Burlington & Quincy.**—Contracts have been let by this company for the building of a branch which is to run from Republican, Neb., southwest to Oberlin, Kan., a distance of 78 miles. Work is to be begun at once, and is to be completed by Oct. 1. The branch will run into a section now without railroad facilities.

**Chicago & Evanston.**—A report that this partially finished road has been transferred to the Chicago, Milwaukee & St. Paul Co. is contradicted as being at least premature. The Chicago & Evanston road is owned by parties who are largely interested in the Milwaukee & St. Paul, but it has always been claimed that it was a distinct project.

**Cincinnati & Eastern.**—An order has been made by the Court allowing Receiver McLean to issue certificates to the amount of \$180,000; the proceeds to be used in changing the gauge of the western end of the road from 3 ft. to standard gauge. The eastern end of the line is already of standard gauge.

**Dallas & Northwestern.**—This company has been organized at Dallas, Tex., to build a railroad from that place northwest to Seymour, in Baylor County, a distance of about 160 miles.

**Deerfield River.**—This company has resumed work on the extension of its road from Sherman, Mass., to which point it was finished last year, to Readsboro, Vt., and this section is to be finished during the present season. A further extension of the road from Readsboro to Wilmington is proposed.

**Delhi & Hudson River.**—The right of way of this line has all been secured, and subscriptions amounting to \$50,000 have also been taken. The line is run from Delhi, N. Y., eastward to a connection with the Ulster & Delaware near Arkville. The distance is about 20 miles.

**Denver, Aspen & Grand River.**—This company has filed articles of incorporation to build a railroad from Red Cliff, Col., down the valley of Eagle River to Grand River, and thence along the Grand and Gunnison rivers to the Utah line. A branch up Roaring Fork to the town of Aspen, is also proposed. The incorporators are New York and Denver parties, who are largely interested in mining in Colorado, and the object of the road is supposed to be the development of their mining property.

**Denver & Rio Grande.**—The strike of the shopmen on this road still continues; but since the first outbreak it has not seriously interfered with the traffic on the road, as the trainmen have so far refused to join, although the shopmen have tried very hard to induce them to do so. The strike is not for an increase of wages, but is against some alleged grievances in the management of the shops, and appears to have been undertaken by an order of the organization known as the Knights of Labor. The Receiver says that he will not give way, and that he can continue the operation of the road for several months without the shopmen.

**Dubuque & Northwestern.**—This company has been organized to build a railroad from Dubuque, Ia., northwest to the Minnesota line. It is to be the Iowa end of the Minnesota & Northwestern road, now under construction. A contract for building 50 miles of the road has been let to N. B. Stickney, representing the Minnesota Loan & Debenture Co., of St. Paul.

**Fitchburg.**—A special meeting of the stockholders was held in Boston, May 7, when it was unanimously voted to accept the act of the Legislature authorizing a consolidation with the Boston, Barre & Gardner, and to approve this consolidation. As already noted, the consolidated company assumes all liabilities of the Boston, Barre & Gardner, and will issue one share of its stock for 10 shares of that company.

Resolutions were also passed authorizing the directors to issue bonds or interest bearing notes to an amount not to exceed \$500,000 at 5 per cent. interest, to be used for the purpose of funding the floating debt of the company.

**Fort Worth & Denver City.**—The extension of this road is now completed to Harrold in Wilbarger County, Tex., 40 miles northwest from the late terminus at Wichita Falls and 150 miles from Fort Worth. Extensive stock yards have been built at the new terminus, and shipments of cattle from that point have already begun. The object of the extension was to retain the live stock business of the road, the country about the old terminus of the road having been so settled and fenced in that it was becoming almost impossible to drive cattle to that point.

**Grand Rapids & Indiana.**—The following circular from General Freight Agent C. E. Gill is dated May 15:

"Notice is hereby given that this company is now prepared

to transfer cars containing all classes of bulk as well as package freight across the Straits of Mackinaw."

**Gulf, Colorado & Santa Fe.**—This company has had a survey completed for the proposed extension of its road from Lampasas, Tex., by way of San Saba and San Angelo, to Colorado. The distance is about 90 miles. Another line is to run from Lampasas, by way of Brownwood and Coleman. The company will not decide upon the line to be adopted until after the engineers have presented their report.

**Hayward & Southern.**—This company has filed articles of incorporation to build a railroad from Hayward, Wis., southward to a point on the Chippewa River. The distance is 45 miles, and the capital stock is fixed at \$500,000.

**Highland Junction.**—The bill authorizing this company to build a bridge over the Hudson River at the head of the Highlands has been defeated in the New York Assembly by a large majority. This is the so-called Storm King Bridge project, the projectors of which recently attempted to secure a guarantee of their bonds from the Massachusetts Legislature. A large number of remonstrances against the construction of the bridge at that point were presented to the Legislature.

**Houston & Texas Central.**—The Receivers of this road having made application to the court for leave to borrow money, the Master, to whom the application was referred, recommends that the court allow them to borrow \$147,900 for the purpose of settling traffic balances and paying the February pay roll.

**Indianapolis, Eel River & Southeastern.**—At a meeting of the stockholders at Minneapolis last week, it was resolved to resume work and to complete the line, if possible, as far as connection with the Louisville, New Albany & Chicago. A little grading has been done on the road, and although it was begun three years ago, there is still much to be accomplished to complete it.

**Kansas City & Southern.**—This road has been opened for traffic from Clinton, Mo., southward to Osceola, a distance of 30 miles. The grading and bridges are now ready for the rails from Clinton northwest to East Lyon, on the Missouri Pacific, a distance of 40 miles, and tracklaying will be begun on that section very shortly. The line of this road is parallel and close to that of the Kansas City, Clinton & Springfield, which is now under construction.

**Leadville, South Park & London.**—This company has filed articles of incorporation in Colorado to build a railroad from London in Park County, through Mosquito Gulch, to a junction with the Union Pacific's High Line, and thence down the valley of the Arkansas to Leadville. The incorporators are principally residents of Denver, one of them being Mr. D. H. Moffat, President of the Denver & Rio Grande.

**Manhattan.**—The following statement for the month of April is published:

Gross earnings.....	\$504,602
Expenses (51.9 per cent.).....	308,574
Net earnings.....	\$286,028
Interest and rentals.....	\$119,066
Taxes.....	21,613
Surplus.....	\$145,349

This surplus is equal to 0.56 per cent. on the stock. The gross earnings for nine days of the current month were \$179,147.

**Martin's Creek.**—The amount necessary to secure the construction of this road has been subscribed by parties interested, and work upon it will be begun as soon as the right of way can be secured. The road is to run from Bangor, Pa., to the Delaware River at Martin's Creek, 15 miles, and will connect by a bridge across the river with the Belvidere Division of the Pennsylvania Railroad. It will furnish the Bangor slate quarries with a new outlet over the Pennsylvania road.

**Minnesota & Northwestern.**—Tracklaying on this road, which was begun recently at Cascade, Minn., has been pushed forward actively, and the rails are now laid from Cascade to a point within 7 miles of St. Paul, about 25 miles having been completed. As soon as the track reaches St. Paul the working force will be transferred to the section from Cascade southward.

**Montreal, Portland & Boston.**—The securities of this company, which are held by the Receiver of the Vermont National Bank at St. Albans, were offered for sale in that place last week, and a number of bids were received. It has been announced that the Passumpsic Co. would join the sale, but no injunction was served on the Receiver of the bank, who took the bids under consideration.

**Nashville, Chattanooga & St. Louis.**—This company has been offered a bonus to extend its branch line from Dickson, Tenn., to Cumberland Furnace, a distance of 14 miles, and the extension will probably be built. The bonus is offered by a New York syndicate which has recently bought a large tract of timber and iron land lying around Cumberland Furnace.

**Nevada & California.**—This company has been organized as successor to the Nevada & Oregon, and has assumed possession of that road, which is a narrow-gauge line extending from Reno, Nev., to Oneida, 30 miles.

**New York Central & Hudson River.**—This company's statement for the quarter ending March 31 and the six months of the fiscal year from Oct. 1 to March 31 is as follows:

	Quarter.	Half-year.	1884-85.	1883-84.
Earnings.....	\$5,982,222	\$6,716,591	\$12,772,362	\$14,624,719
Expenses.....	4,007,215	4,218,893	7,910,502	8,900,692
Net earnings.....	\$1,955,007	\$2,491,698	\$4,832,000	\$5,724,027
Int. rents and taxes.....	1,485,000	1,395,000	2,985,000	2,790,000
Surplus.....	\$470,007	\$1,096,698	\$1,847,000	\$2,934,027
Dividends paid.....	894,283	1,788,596	2,235,707	3,577,132
Deficit.....	\$424,276	\$691,898	\$388,617	\$643,105

The working expenses (not including taxes) were 67.21 per cent. of gross earnings for the quarter and 62.16 per cent. for the six months this year, against 62.86 and 60.86 per cent. last year. The dividends paid this year were 1 per cent. for the quarter and 2½ for the half-year, the surplus earned being 0.52 per cent. on the stock for the quarter and 2.06 per cent. for the half-year. Last year the company paid 2 per cent. for the quarter and 4 per cent. for the half-year, the amounts earned being 1.22 and 3.28 per cent. on the stock.

For the half-year the gross earnings decreased \$1,852,327 (12.7 per cent.) and the expenses \$960,340 (10.7 per cent.), leaving a decrease of \$891,987 (15.6 per cent.) in net earnings.

The only changes of any amount in the balance sheet during the quarter are decreases of \$802,427 in accounts paya-



ble and of \$604,477 in interest accrued on one side, and a reduction of \$1,892,128 in cash on hand on the other.

**New York, Lake Erie & Western.**—A suit of some importance was begun in the New York Supreme Court last week by Frederick Broughton and others, whose complaint alleges that this company has been diverting traffic from the Chicago & Atlantic road contrary to the terms of a contract between the two companies, and asked that the company be enjoined from further violation of the agreement. The complaint also charges that the Erie Co. retains in its possession money due the Chicago & Atlantic, and refuses to make any settlement. The Court granted the usual temporary injunction, and an order to show cause.

**New York, New Haven & Hartford.**—This company's statements to the New York Railroad Commission give the following figures for the quarter ending March 31 and the six months of the fiscal year from Oct. 1 to March 31:

	Quarter.		Half-year.	
	1885.	1884.	1884-85.	1883-84.
Gross earnings.....	\$1,524,467	\$1,484,205	\$3,180,712	\$3,193,517
Expenses.....	805,087	913,901	1,907,147	2,104,936
Net earnings.....	\$719,380	\$570,304	\$1,273,565	\$1,088,581
Other income.....	1,308	1,434	4,794	9,405
Total.....	\$720,648	\$571,738	\$1,278,359	\$1,101,078
Charges.....	204,948	251,019	409,895	661,902
Surplus.....	\$515,698	\$320,719	\$868,464	\$439,174
Dividends paid, 5 per cent.....			775,000	775,000
Surplus or deficit.....			\$93,464	\$335,836

In these reports taxes are not included in expenses, but are placed with interest and rentals under the head of charges. For the half-year the decrease in earnings was \$15,805 (0.5 per cent.), but the expenses were reduced by the large amount of \$197,789 (9.4 per cent.), the result being a gain of \$181,984 (16.6 per cent. net earnings). The large decrease in charges is probably due to some change in the division of accounts by quarters. The deficit or dividend in 1883-84 was made up in the second half of the year.

**New York, West Shore & Buffalo.**—At a conference held last week, between the Hewitt Committee and others, a modified plan of reorganization was presented which provides for the issue of \$110,000,000 of bonds and stocks instead of the \$135,000,000 proposed by the old plan. To be specific, it provides for the issue of \$20,000,000 of first mortgage bonds instead of the \$25,000,000 of the old plan of \$50,000,000 second mortgage bonds and \$5,000,000 first preferred stock; of \$15,000,000 second preferred stock, the same amount of like stock as proposed by the old plan, and of \$20,000,000 common stock, instead of \$40,000,000 common stock.

The first-mortgage bonds are to be applied, as provided in the old plan, to the settlement of certificates and other debts created by the Receivers of West Shore, the satisfaction of judgments, the discharge of liens and purchase money mortgages covering property of the company, the liquidation of unadjusted claims for rights of way and other real estate, the extinguishment of trusts on cars and locomotives, and for the acquisition of the terminal properties and facilities. By this last phrase is meant, it is asserted, an exchange for the bonds issued by the terminal company.

The second-mortgage bonds, which are convertible at the option of the holders into first preferred stock, are to be exchanged for the existing first-mortgage bonds at par, and the \$5,000,000 of first preferred stock is to be exchanged at par for the unpaid coupons of the existing first-mortgage bonds. It is also provided that the voting power of the new company shall be vested in the second-mortgage bonds and first preferred stock. The old plan provided for the issue of \$55,000,000 first preferred stock, to be exchanged for the existing first-mortgage bonds and coupons in the ratio of 110 to the par of the bonds.

The second preferred stock is to be used in settlement of the claims of the North River Construction Co., its creditors, the New York, Ontario & Western Railway Co., and other creditors of West Shore.

The common stock is to be exchanged for the existing common stock in the ratio of one share for two. The bonds are to bear interest at 5 per cent., and the stock at 6 per cent., and the interest is to be paid from the net earnings of the company in the order of the precedence of the several classes of securities.

The Colgate committee has also prepared a plan which calls for the appointment of a "committee of reorganization," composed of the bondholders. Those agreeing to the scheme are to deposit their bonds with the Farmers' Loan & Trust Co., and each million dollars of bonds shall have the right to nominate seven members of the committee, and the seven persons receiving the highest number of votes shall constitute the committee. They shall have discretion as to the plan to be adopted, subject to the following limitations:

First.—The control of the reorganized company must be in the hands of the majority of the present first-mortgage bondholders.

Second.—No first-mortgage or other lien must be placed on the property of the new company in advance of the interests of the present first-mortgage bondholders which shall exceed, in the total \$15,000,000.

Third.—In order that the new company may have a reasonable opportunity to perfect its road-bed, tracks, equipment, etc., the present first-mortgage bondholders consent that interest on the securities of such new company, issued to them in lieu of their present first-mortgage bonds, shall not bear interest for three years, and that the rate of interest thereafter shall be 4 per cent., with the proviso, however, that if a sufficient amount is not earned by the new company to pay said interest, the same shall not be cumulative. It is understood that unless within 30 days from May 12, signatures representing \$10,000,000 of bonds are obtained to this scheme, the bonds so deposited shall be returned and the trust company shall give its negotiable certificates for all bonds deposited with it.

**Northern Pacific.**—The extension of the St. Paul & Northern Pacific Road (which is leased to the Northern Pacific Co.) from Minneapolis to St. Paul, has been decided on, and the contract has been let to Winston Brothers, of Minneapolis, for the grading and all the bridging, with the exception of the bridge over the Mississippi. The contractors will begin work very shortly. The new line will leave the present road in East Minneapolis, and most of the right of way for it has been secured.

**Ohio Central.**—A circular issued May 12 by the Canda Reorganization Committee of the Ohio Central Railroad contains the following propositions: A new company is to be incorporated June 1, to be called the Toledo & Ohio Central Railway Co. The Columbus, Hocking Valley & Toledo Co. proposes to give Hocking Valley stock, share for share, for the new preferred stock of the Ohio Central to the extent of three-fourths of the Ohio Central preferred stock; the new common stock of Ohio Central is to receive one share of Hocking Valley stock for two shares of Ohio Central to the extent of three-fourths of the common stock. It is proposed

to place all of the Ohio Central stock in the hands of trustees. It is stipulated in the proposition that the new preferred stock shall not exceed \$3,108,000, and the new common stock shall not exceed \$1,600,000, and the Hocking Valley stock at the time of the exchange shall not exceed \$11,700,000. The Ohio Central Co. is to issue \$3,000,000 of the \$5,000,000 of 5 per cent. bonds authorized, and the remaining \$2,000,000 bonds shall not be issued except to pay for terminal property or equipment.

The committee declares that if the Ohio Central stock is exchanged for Hocking Valley stock the Hocking Valley Co. will guarantee the interest on the new Ohio Central bonds. It is urged that the acceptance of this plan by the Ohio Central stockholders will do away with competition between the rival lines. The proposition is likely to be opposed by the holders of terminal and equipment bonds.

**Oregon & California.**—In answer to the petition of the Receiver of this road, the United States Circuit Court decides that the railroad law passed recently by the Oregon Legislature is constitutional. The bill, as we have already noted, provides that the passenger fares shall not be more than 4 cents per mile, and the freight rates shall not exceed the rates in force Jan. 1, 1885. The bill also provides against discriminations. The Court holds, that this bill being constitutional, it cannot interfere with its operation, and accordingly instructs the Receiver that he must obey the law, which is to take effect May 20.

A London dispatch of May 9 says that the Bondholders' Committee has agreed upon a plan for the sale of the road to the Central Pacific Co., and its consolidation with that company. Under this plan the Central Pacific is to issue its bonds in exchange for Oregon & California bonds, and the stock is also to be exchanged. The Committee will send an agent to New York to arrange the details of the consolidation.

**Pennsylvania.**—This company is offering, through Speyer & Co., in London and New York, \$3,960,000 of its collateral trust 4½ per cent. bonds, being the balance of the authorized issue of \$10,000,000. The subscription opened May 14, the bonds being offered at 101 and interest.

**Philadelphia & Reading.**—The board of managers, on recommendation of the Financial Committee, has approved the modified or compromise plan of reorganization adopted by the two committees. A few verbal alterations were made, but they are all unimportant.

The Union Canal is to be sold under foreclosure, May 19, and a meeting of the bondholders has been held to secure cooperation in purchasing the property. There are \$3,000,000 bonds outstanding, of which the Philadelphia & Reading Co. holds \$2,000,000. The canal is 80 miles long, and portions of it have a considerable traffic, and there are also some valuable water-powers.

The audit of the account of the Receivers of the Reading Railroad by Master George M. Dallas shows a balance carried forward on Feb. 1 of \$82,434, which, added to the receipts for the month, makes a total of \$1,909,728. Deducting from this the disbursements of the month a balance of \$76,342.42 is brought forward on March 1. The Reading Coal & Iron Co.'s account shows a balance on Feb. 1 of \$2,783, which, added to the month's receipts, makes \$673,243, leaving a balance on March 1 of \$7,555.

**Pittsboro.**—The incorporators of this company met in Pittsboro, N. C., May 9, and completed the organization of the company. The board of directors chosen were instructed to have surveys made for the road, which will be about 10 miles long, from Pittsboro to a connection with the Raleigh & Augusta Air Line. The directors were also instructed to secure additional subscriptions to the stock, and to make application to the state for the services of convicts to be employed in building the road.

**Pullman's Palace Car Co.**—The attempt to alter the lease of the Central Transportation Co. having failed, a circular was issued last week to the stockholders of the company, offering them the privilege of exchanging their stock for stock of the Pullman Co. at the rate of 4 shares for 1, the new stock given to carry the May dividend with it. A conference was held in Philadelphia, May 11, between Mr. Pullman, President of the Pullman Co., on the one hand, and the directors of the Central Transportation Co. on the other. They inform Mr. Pullman that his proposition for exchange would not be accepted, as it was practically a repetition of the offer which has been rejected by the stockholders at a recent meeting. After much discussion he made a further offer to buy all the stock of the Central Co. at \$30 a share. This was not accepted, and the conference adjourned, with the understanding that the Central directors would prepare a proposition to be submitted to the Pullman Co., which will be their final offer for settlement.

**San Antonio & Aransas Pass.**—The directors of this new company have secured a subscription to an amount sufficient to warrant them in beginning work on the construction of the road. They have let the contract for the grading of 20 miles, from San Antonio, to Thomas Johnson, of Houston, Tex., who is to begin work at once.

**Santa Fe & St. Johns River.**—This company was recently organized at a meeting held in Lake Butler, Fla. The proposed line is from Lake Butler, southeast to Santa Fe, and thence eastward to some point on the St. Johns River. The distance is about 60 miles.

**Sonora.**—The earnings of this line for March and the three months ending March 31 were:

	March.		Three months.	
	1885.	1884.	1885.	1884.
Earnings.....	\$28,827	\$19,841	\$81,379	\$55,713
Expenses.....	21,083	22,148	61,014	69,152

Net or deficit..... N. \$7,744 D. \$2,307 N. \$20,365 D. \$13,439  
The road is owned by the Atchison, Topeka & Santa Fe, extending that company's road from Nogales on the Arizona line to Guaymas on the Gulf of California.

**Texas & St. Louis.**—The final account of Receiver Woodward, from Feb. 1 to April 13, the date when he was relieved, is as follows:

Receipts, old accounts.....	\$442
Receiver's current accounts.....	264,849
Receiver's certificates.....	7,882

Total.....	\$273,173
Disbursements, old accounts.....	\$7,292
Receiver's accounts.....	190,297

Balance on hand..... \$75,584  
For the period named the actual earnings of the road were \$5,798 in excess of the working expenses.

**Tonawanda Valley & Cuba.**—A suit brought by the employes of this road is now pending in Buffalo, having been begun in that city last week. The employes asked the Court to direct the Receiver to pay them their wages for September, October and November last, being three months prior to his appointment. The Receiver represented that the road, and especially the bridges, were in a very bad condition; that he had no money to repair them, and that the trustees had interposed objections to the issue of certificates. The

case was put over until the June term, testimony to be taken in the meantime.

**Troy & Greenfield.**—The bill for the disposition of this road now pending in the Massachusetts Legislature provides that any railroad corporation, either now existing or hereafter formed, which shall be in possession of a continuous line of railroad extending from a connection with the Troy & Greenfield road to an eastern terminus in Boston, or its immediate neighborhood, may negotiate with the Governor and Council for the union or consolidation of the Troy & Greenfield road, including the Hoosac Tunnel, with its own line, and the bill gives authority to the Governor and Council to conclude such union or consolidation, and to accept stock and bonds of the railroad company in consideration therefor.

**Versailles & Midway.**—The contract for building this road has been let to Messrs. Nolan & Sweeney, of Lexington, Ky., who agree to have the grading finished in 60 days. The road is to run from Versailles in Woodford County, Ky., northward to Midway, on the Elizabethtown, Lexington & Big Sandy road. The distance is about 8 miles.

**Wabash, St. Louis & Pacific.**—The report of the Bondholders' Committee, which was presented at the London meeting, states that, after long negotiation, the committee were able to communicate to the bondholders the outline of a proposed arrangement, as follows:

"1. That in the proposed reorganization, new general mortgage bonds, limited to the amount of the existing bonds—viz., \$17,000,000—shall be issued in exchange for the present bonds, bearing, however, 5 per cent. interest instead of 6 per cent., and depending on income for the first five years.  
2. That foreclosure rights shall be suspended for this period of five years, and not be exercised for two years thereafter.  
3. That general mortgage bondholders shall have a fair and proper representation on the board during the income period.  
4. That the collateral trust bonds and the floating debt shall be extinguished out of the proposed assessment on the shareholders, and by new first preference stock, to rank after the general mortgage.  
5. That the assessment on the stockholders shall be \$8 per share on the preferred and \$6 on the common, such assessment to be represented by new first preference stock."

Since then the Committee have succeeded in arranging that during the five years in which the payment of interest is to depend upon the income the bondholders shall nominate one-half the directors, the shareholders to elect the other half of the board, and the President to be elected by agreement among the directors thus chosen. With regard to the securities included in the collateral trust mortgage, after much negotiation the Committee succeed in arranging that all these securities, without distinction, should form part of the new general mortgage. Quite a large amount of these securities, it is stated, represented the control of lines which could not be surrendered without serious damage to the company, and it therefore considers that it has secured all the points in dispute, with the single exception of the reduction in interest from 6 to 5 per cent. This they were obliged to concede in order to secure assessments on the stock, which they regard as essential.

In relation to the floating debt, the Committee state that they have been unable to secure any adjustment. The statement received from the company shows an amount of floating debt, which, after deducting the amount of the proposed assessments, leaves a balance of \$1,515,734. Subsequently information was received that in the company's statement the sum of \$900,000 had been accidentally omitted. There were also other current liabilities, including receiver's certificates, which might bring up the amount omitted to \$1,500,000, making the total amount of the floating debt not provided for by the assessments about \$3,000,000. This sum, the Committee reported, was entirely too large to be carried, and unless some provision can be made for it it would be fatal to the proposed plan of reorganization. The members of the Committee have been unable to find any plan for the adjustment of this difficulty, and therefore reported all the facts to the stockholders, with the recommendation that the whole matter be referred to a new committee to continue the negotiations.

When the Indianapolis Division was released on petition of the trustees from the Wabash system, the Chicago, Cincinnati & Louisville Railroad, which extends from Laporte to Peru, in Indiana, and is a leased line of the Indianapolis, Peru & Chicago, was not included in the release. In St. Louis, May 9, the Trustee of the mortgage on this unleased branch, George T. M. Davis, filed a petition for the surrender of the branch by the receivers in 30 days. He said there was held recently a meeting of \$600,000 of the \$1,900,000 bondholders, in which a plan of reorganization was accepted. The trustee was instructed to secure the surrender of the road from the Court and proceed with all possible speed to foreclose the mortgage. The petition was referred to Master Allen, who was instructed to report with all convenient speed. The hearing was held in the afternoon, there was no opposition, and the Master reported favoring the release. The Court upon this confirmed the report and made the order, which conditioned that the Trustee have the right to proceed with the foreclosure proceedings begun under his cross-bill in the United States Circuit Court for the District of Indiana, and the Receivers appear therein to protect their rights, and that the road shall not be wholly taken out of the Court's jurisdiction.

Messrs. Humphreys and Tutt, Receivers, have just issued a circular to holders of the main line bonds of this company, stating that:

"The decrease in earnings and increase in expenses occasioned by the unusually severe winter, together with the loss incurred in operating certain branch lines, from which the recent orders of the Court will hereafter give substantial relief, have rendered it impossible for the Receivers to pay on May 1, as they had hoped to do, the interest due Feb. 1 on the following bonds, viz.: Toledo & Illinois, first mortgage; Lake Erie, Wabash & St. Louis, first mortgage; Great Western, first mortgage; Illinois & Southern Iowa, first mortgage; Decatur & East St. Louis, first mortgage; Toledo, Wabash & Western, consolidated mortgage. They feel, however, justified in advising the bondholders of their expectation of being able to pay these coupons on or about June 15, and in like manner to pay in July the coupons of the main line and St. Charles Bridge bonds maturing March 1 and April 1."

An opinion has been given by the United States Supreme Court in the case of the Wabash Co., appellants, vs. Benjamin F. Ham et al., on appeal from the Circuit Court. The decree of the Circuit Court is by this judgment reversed, and the cases remanded with directions to disallow the liens claimed by the holders of old equipment bonds.

A dispatch from London, England, May 9, says: "The Wabash Railway Committee, appointed under the auspices of the English Association of American Bondholders, have united with the First Wabash Committee, composed of members of the Railway Share Trust, and who favor the scheme of reorganization advocated by Mr. Joy. The union is arranged on an agreement that no reconstruction shall be completed until the figures in the report furnished by the company are confirmed by a thorough inquiry. No importance, however, is attached to the terms of the agreement, and the junction the committees have formed means the cessation of English opposition to the Joy proposals."